
JOURNAL

OF THE

ARNOLD ARBORETUM

VOL. XXV

APRIL, 1944

NUMBER 2

PLANTS OF COAHUILA, EASTERN CHIHUAHUA, AND ADJOINING ZACATECAS AND DURANGO, V¹

IVAN M. JOHNSTON

LORANTHACEAE

Phoradendron lanceolatum Engelm. Mem. Am. Acad. 4: 54 (1849).

COAHUILA: Sierra Gloria, *Marsh* 1872; Hillcoat Canyon, west of Buena Vista Ranch, July 13, 1938, *Marsh* 1332; Sierra Madera, Cañon Pajarito, on white oaks, *Muller* 3201.

Known only from eastern Coahuila and northern Nuevo Leon. The type was collected on *Quercus* by Gregg (no. 255), Feb. 11, 1847, at Rinconada, just east of the Coahuila-Nuevo Leon boundary along the road between Saltillo and Monterrey. The species is readily recognized by its very elongate glabrous leaves 5-9 cm. long.

Phoradendron tomentosum (DC.) Engelm. in Gray, Jour. Boston Soc. Nat. Hist. 6: 212 (1850).

Viscum tomentosum DC. Prodr. 4: 670 (1830).

Phoradendron Greggii Trel. Monog. Phorad. 36. t. 32 (1916).

VERNACULAR NAME: Injerto.

COAHUILA: Rancho Falcon, 12 mi. west of Berrendo, *Wynd* 732; Sierra Madera, Cañon Pajarito, on *Acacia* and other legumes, *Muller* 3202; Puerto San Lazaro, *Wynd & Mueller* 133; Cañon de Jara, on *Acacia*, *Johnston* 8838; 60 mi. west of Cuatro Cienegas, on *Prosopis*, *White* 1957; 5 mi. west of Americanos, on *Prosopis*, *Muller* 3292; east of San Antonio de los Alamos, on *Prosopis*, *Johnston* 8278; near Santa Elena, Sierra Cruces, on *Forestiera*, *Johnston & Muller* 229; 6 mi. northwest of El Oro, road to Sierra Mojada, *White* 1976; 30 mi. south of Sierra Mojada, *Wynd* 770. ZACATECAS: Cedros, *Lloyd & Kirkwood* 15.

This is the common *Phoradendron*, usually found on *Prosopis* and *Acacia*, in the broad valleys and in the lower canyons on the plateau of northern Mexico, ranging from northern San Luis Potosi and Zacatecas north into trans-Pecos Texas. The type was collected in Dec. 1827 "supra Mimoseas" by Berlandier (no. 1364) near Catorce in northern San Luis Potosi. *Phoradendron Greggii*, based upon collections from *Prosopis* and other

¹The third paper in this series, in which the treatment of the monocotyledons was completed, appeared in Jour. Arnold Arb. 25: 43-83 (Jan. 1944). The fourth part, covering the families Saururaceae to Urticaceae, will appear later this year.

legumes at Rinconada, just east of the Coahuila boundary on the road between Saltillo and Monterrey, appears to be a synonym.

In our area the species seems readily recognizable by its thickish orbicular-ovate to ovate-oblong leaves and the grayish velvety indument on the spikes and younger leaves and branches. In trans-Pecos Texas it is difficult, if not impossible, to separate it from plants collected on *Juglans*, *Celtis*, *Quercus*, and *Prosopis*, which appear to be pubescent phases of *P. Engelmanni*. Most of the typical *P. tomentosum* from Texas comes from the Big Bend area, and grows on *Prosopis* and *Acacia*.

Trelease, Monog. Phorad. 36, reports material of *P. Greggii* from Jimulco (Pringle 845) and Peña (Purpus 1106). The collection from Gomez Farias (Palmer 291) which he refers to *P. thyrsoides* probably also belongs to *P. tomentosum* as here accepted.

Phoradendron Engelmanni Trel. Monog. Phorad. 35 (1916).

COAHUILA: Rancho Babia, *Marsh 1216*; along arroyo southwest of Sierra Azul, Rancho Buena Vista, July 8, 1938, *Marsh 1262, 1263*.

The above collections have the green, inconspicuously pubescent stems and thin leaves of typical *P. Engelmanni*, a plant growing on *Ulmus*, *Prosopis*, and *Quercus* about the eastern and southern escarpments of the Edwards Plateau in Texas.

Phoradendron macrophyllum (Engelm.) Cockerell, Am. Nat. 34: 293 (1900).

Phoradendron Cockerellii Trel. Monog. Phorad. 38. t. 36 (1916).

Under the name *P. Cockerellii*, Trelease, l. c., reports a collection of the species from Juarez, Chihuahua. A completely glabrous form of the species occurs on *Populus*, *Salix*, and *Fraxinus* along the Rio Grande in southern New Mexico and along the southern boundary of Texas as far down the river as Presidio. The large broad bright green usually completely glabrous leaves, glabrous spikes, and its favoritism for trees growing in river-bottoms usually permit its recognition. It grows from trans-Pecos Texas to Arizona and in adjoining Mexico.

Phoradendron Coryae Trel. Monog. Phorad. 43. t. 44 (1916).

Phoradendron Wilkinsoni Trel. Monog. Phorad. 44. t. 45 (1916).

VERNACULAR NAME: Injerto.

COAHUILA: Sierra Gloria, *Marsh 1896*; Hillcoat Canyon, west of Buena Vista Ranch, July 13, 1938, *Marsh 1334*; Hillcoat Mesa lying west of Encantada Ranch, July 25, 1938, *Marsh 1469*; Sierra Madera, Cañon Pajarito, on white oaks, *Muller 3173A & B*. CHIHUAHUA: Sierra Organos, *LeSueur 1307*.

A well marked species, readily recognizable by its dense close persistent indument of very numerous minute stellate hairs which form a crustose covering on its branches and thick leaves. It ranges from trans-Pecos to Arizona and northern Mexico, almost exclusively on oaks. The type of *P. Wilkinsoni* was collected in the Sierra Santa Eulalia, April 3, 1885, by Wilkinson.

Phoradendron flavum Johnston, Jour. Arnold Arb. 24: 93 (1943).

COAHUILA: Sierras Negras, 9 km. south of Parras, on *Quercus*, *Stanford et al. 210*; hills 11 km. northeast of Jimulco, on *Quercus*, *Stanford et al. 71*.

This species is otherwise known only from the type, which was collected

on oaks near Durango City by Palmer (no. 777). A plant with a tawny indument and thick dark green leaves.

Phoradendron pauciflorum Torr. Pac. R. R. Rep. 4: 134 (1857).

Phoradendron saltillense Trel. Monog. Phorad. 27. t. 16 (1916).

COAHUILA: Sierra del Carmen, Cañon Sentenela, Wynd & Mueller 625; Sierra del Carmen, Aug. 21, 1936, Marsh 567, 569; Hillcoat Canyon, west of Buena Vista Ranch, July 13, 1938, Marsh 1292; Sierra Madera, Cañon del Agua, on *Cupressus*, Muller 3220; San Antonio de las Alanzanas, on cedars, Aug. 31, 1848, Gregg 399 (isotype of *P. saltillense*); Sierra Negras, 9 km. south of Parras, on *Juniperus*, Stanford et al. 149.

I am unable to distinguish the plant of eastern Coahuila from *P. pauciflorum*, a species of western North America ranging from Oregon to Baja California and Arizona. The species is not known from Texas, New Mexico, or Chihuahua. In our area it parasitizes *Juniperus* and *Cupressus*. These same genera, and also *Abies*, are the hosts of the plant in the western United States.

Phoradendron Bolleanum (Seem.) Eichl. in Mart. Fl. Bras. 52: 134 (1868).

CHIHUAHUA: Sierra Santa Eulalia, on *Juniperus*, April 1885, Pringle 256.

A species of the Sierra Madre Occidental, ranging from Durango north into Arizona and western Texas. The species has been repeatedly collected on *Juniperus* and *Arbutus*.

Arceuthobium vaginatum (H.B.K.) Eichl. in Mart. Fl. Bras. 52: 105 (1868).

COAHUILA: Sierra del Pino, on *Pinus arizonica*, Johnston & Muller 591; General Cepeda, Nelson 6730.

A Mexican species extending north into the United States to Arizona, Colorado, and trans-Pecos Texas. In northern Mexico and the United States it is usually confined to yellow pines.

SANTALACEAE

Comandra pallida A. DC. in DC. Prodr. 14: 636 (1857).

COAHUILA: Sierra del Carmen, Cañon Sentenela, Wynd & Mueller 543; Sierra del Carmen, Aug. 26, 1936, Marsh 599. CHIHUAHUA: Road between Samalayuca and El Paso, April 17, 1852, Wright 1784.

A parasitic herb widely distributed in the United States reaching its southern limit in our area.

RAFFLESIACEAE

Pilostyles Thurberi Gray, Mem. Am. Acad. II. 5: 326 (1854).

Apodanthes Pringlei Wats. ex Robinson, Bot. Gaz. 16: 83 (1891).

Pilostyles Pringlei Rose, Contr. U. S. Nat. Herb. 12: 264 (1909).

COAHUILA: Hac. Mariposa, east slope of Sierra de Puerto Santa Anna, on *Dalea*, Wynd & Mueller 256; Sierra Fragua, high western ridge north of Puerto Colorado, on *Dalea*, Johnston 8783.

The collection from the Sierra Fragua is a female plant and is very similar to the type of *P. Thurberi* from *Dalea* in southwestern Arizona. The material from Hacienda Mariposa is a male plant. Its flowers are more elongate and lighter than are the female flowers. It seems probable that only a single species of this remarkable stem-parasite infects shrubs of the genus *Dalea* and that in all probability *P. Covillei* Rose (from Texas),

P. glomerata Rose (Puebla), *P. Palmeri* Rose (San Luis Potosi), and *P. sessilis* Rose (Hidalgo) are all phases of *P. Thurberi*. These species are known only from shrubby species of *Dalea*. A well-marked species, *P. globosa* (Wats.) Solms-Laub., a parasite on *Bauhinia*, is known from Monterrey. It should be looked for in Coahuila.

ARISTOLOCHACEAE

Aristolochia longiflora Engelm. & Gray, Jour. Boston Soc. Nat. Hist. 5: 259 (1845).

COAHUILA: Muzquiz, 1935, *Marsh 11*.

A plant of south-central and southern Texas, reaching its southern limit in eastern Coahuila.

Aristolochia Marshii Standl. Field Mus. Publ. Bot. 17: 238 (1937).

COAHUILA: Muzquiz, April 1938, *Marsh 1143*.

The type of this species was collected near Muzquiz, by Marsh (no. 10) in the spring of 1935. It is known only from near Muzquiz and in the vicinity of Monterrey. The stems are elongate, slender, and apparently twining.

Aristolochia lassa Johnston, Jour. Arnold Arb. 21: 255 (1940).

COAHUILA: Saltillo, common on bottom-lands, 1898, *Palmer 187* (TYPE); Saltillo, 1909, *Nil 10* (US); Carneros area, 1880, *Palmer 1183*.

A well-marked species known only from the collections cited above. This species is probably most closely related to the Texan *A. Coryi*, from which it differs in its abruptly bent rather than nearly straight perianth-tube, its lance-ovate rather than elliptic limb, and the somewhat retrorsely ascending or appressed hairs on the stem.

Aristolochia Coryi Johnston, Jour. Arnold Arb. 21: 256 (1940).

This species ranges from west-central Texas (Mitchell, Tom Green, Edwards, and Kinney Counties) west to Brewster County, Texas, where it has been collected at various stations in and around the Chisos Mts. In 1928 E. J. Palmer (no. 34225) collected it in clefts of rocky cliffs in the Grand Canyon of the Rio Grande near Castellan. At this station, now usually known as Santa Helena Canyon, *A. Coryi* makes its closest known approach to the range of *A. Wrightii*, for that more western and southern species has been collected on Mesa de Anguila, the mass of limestone through which the Rio Grande has cut Santa Helena Canyon.

Aristolochia Wrightii Seem. Bot. Voy. Herald 331. t. 72 (1856).

Aristolochia Wrightii var. *texana* Johnston, Jour. Arnold Arb. 21: 254 (1940).

VERNACULAR NAMES: Yerba del Indio; Pimpinela.

COAHUILA: Sierra Hechiceros, Cañon Indio Felipe, *Stewart 150*; Sierra Moreno, southeast of Castillon, *Johnston & Muller 1262*; vicinity of Santa Elena, east base of Sierra Cruces, *Johnston & Muller 232*, *Stewart 228*, 1925; Sierra Cruces, Cañon Tinaja Blanca, *Johnston & Muller 292*, *Stewart 325*, 574, 633; near San José, southeast base of Sierra Cruces, *Johnston & Muller 1001*; Sierra Planchada, Cañon Gringo, *Stewart 1045*; Sierra Mojada, April 19, 1892, *Jones 52* (US); San Antonio de los Alamos, *Johnston & Muller 902*; Puerto San Lazaro, *Muller 3044*; Rancho Las Uvas, east side of Valle Acatita, *Stewart 2689*; Torreon, Feb. 1905, *Purpus 1057*; 6 mi. west of Viesca, *Johnston 7746*. CHIHUAHUA: Rancho San José del Progreso, south end of Sierra Seca, *Stewart*

2329; Rancho El Pino, southeast of Sierra Rica, *Stewart* 2385; 8 miles northwest of Cruces, *Johnston* 7986 (type of var. *texana*); 3 mi. south of Pirámide, *Johnston* 8114; 7½ miles south of Pirámide, *Johnston* 8099; 2 miles east of El Coyote, *Johnston & Muller* 1407; Sierra Encinillas, near Fierro, *Stewart* 800; rocky hills near Chihuahua, April 1885, *Pringle* 9; west base of Sierra Santa Eulalia, *Stewart & Johnston* 2107; northwest of Chihuahua, Aug. 1, 1936, *LeSueur* 601; Rosatilla Dam east of Meoqui, *LeSueur* 602; Parral, Oct. 4, 1936, *Collins & Kempton* (US). DURANGO: Mapimi, 1898, *Palmer* 540.

I am accepting *A. Wrightii* Seem. as typified by the plant illustrated by Seemann, that is, apparently *Seemann* 2175 from near Durango. This form of the species is exemplified by *Palmer* 314 and 328 from central Durango, a fact I previously did not fully recognize, since I failed to realize that Seemann's illustration of his plant is several times natural size. The typical form of *A. Wrightii* from central Durango strongly suggests *A. brevipes* Benth., from Aguascalientes, but differs from true *A. brevipes*, which has uniformly cordate leaves, and from the plants of San Luis Potosi, Hidalgo, and central Mexico with lobed leaves, which possibly are forms of it, in having more elongate flowers and in having the ovary at anthesis not covered with abundant soft slender more or less reflexed hairs but with less quickly evanescent rather rigid spreading ones. The stems of *A. Wrightii* have usually rather rigid spreading hairs; the stems of *A. brevipes* and immediately related forms have the hairs more or less retrorsely ascending or appressed. The range of *A. Wrightii* is to the north and west of the area occupied by *A. brevipes*.

I have seen typical *A. Wrightii* only from central Durango. The material of *A. Wrightii* from our area and adjoining United States differs from the typical Durango plant in being distinctly more robust, having larger flowers, and, most conspicuously, having an evidently tawny usually somewhat velvety indument of hairs that are longer, more slender, and more abundant. In 1940, on the basis of inadequate material, I attempted to distinguish the material of northern Chihuahua and Texas as var. *texana*. Subsequent collecting has shown that the extreme northern plants are indistinguishable from those found elsewhere in the area of the present report. The name *A. Wrightii* var. *texana*, accordingly, can be amplified and redefined and used for all forms of *A. Wrightii* found in our area, thus permitting them to be distinguished from the typical form of *A. Wrightii* found in central Durango.

Plants representative of the amplified var. *texana* are known from north-eastern Durango, eastern Chihuahua, and western Coahuila. Similar plants are known in eastern Coahuila only at Puerto San Lazaro and in the Sierra Gavia, about 75 km. south of Monclova. In Texas the plant is known from Mesa Anguila and the Chinati, Vieja, Wyle, Eagle, and Davis Mountains. It has been recently collected in the Florida Mts., in Luna County, New Mexico (*Ripley & Barneby* 2486). In our area it is commonly found about the base of cliffs or in sheltered places at the base of rocky slopes. Occasionally, however, it occurs in silty soils in the shelter of bushes on flats subject to flooding after storms. In these latter conditions

it becomes relatively luxuriant and develops leaves over 8 cm. wide. The plant is highly esteemed as a medicinal herb, and in the areas where I have seen it, it is well-known under the name "Yerba del Indio." I have seen it for sale in the market at Chihuahua and have been told that it is also for sale at Torreon.

POLYGONACEAE

Eriogonum atrorubens Engelm. in Wislizenus, Mem. Tour. No. Mex. 108 (1848).

COAHUILA: Carneros Pass area, July 1880, Palmer 1175.

Ranging in the mountains, pine and juniper belts, of Nuevo Leon and adjacent Coahuila, and in northern Durango and western Chihuahua north to extreme southwestern New Mexico. The type was collected near Cusihiuriachic, Chihuahua.

This and the following three species have dark-colored, purple or maroon flowers. The remaining species have pale yellow to whitish corollas frequently more or less stained with red or purple.

Eriogonum hemipterum Torr. ex Stokes, Gen. Eriogonum 21 (1936).

Eriogonum hieracifolium var. *hemipterum* Torr. & Gray, Proc. Am. Acad. 8: 154 (1870).

Eriogonum hieracifolium f. *atropurpureum* Standl. Field Mus. Publ. Bot. 11: 149 (1936); Mueller, Trans. Texas Acad. 20: 16 (1937).

COAHUILA: Sierra del Carmen, Aug. 14, 1936, Marsh 660.

Known only from the Chisos Mts., Texas, and, to the southeast, in adjoining Coahuila, in the northern Sierra del Carmen. The type was collected by Parry on "Hillsides, along the cañons of the Rio Grande, above the mouth of the Pecos," probably near Boquillas Canyon.

Eriogonum hemipterum Torr. var. *griseum* var. nov.

A varietate typica differt foliis subtus dense et abundanter tomentosis.

COAHUILA: Central parts of the Sierra del Pino, near the old log-slide, dry margins of pine forests, erect, 1-3 ft. tall, fl. maroon, 1940, Johnston & Muller 547 (TYPE, Gray Herb.); near Cañon Ybarra, central Sierra del Pino, dry slopes, fl. red, Stewart 1249; Sierra de los Pinos, Dec. 1937, LeSueur 1533. CHIHUAHUA: Valley on high northwest end of Sierra Diablo, grassy meadow, not common, erect, fl. dark red, 1941, Stewart 968.

This plant, known only from the cited material, differs from typical *E. hemipterum* only in the very abundant grayish felt-like indument on the lower surfaces of its leaves and in the slightly more copious indument of more slender hairs on other parts of the plant.

Eriogonum rupestre Stokes, Gen. Eriogonum 21 (1936).

VERNACULAR NAME: Yerba colorado.

CHIHUAHUA: Sierra Encinillas, 8 km. east of Fierro, rocky hillside, not common, fl. red, Stewart 760.

The type and only other known collection of this species was obtained by Pringle (no. 285) on Sept. 28, 1885, in the hills northeast of Chihuahua. I have not seen authentic material, but Mr. Stewart's plant agrees well with the original description. The species is related to *E. atrorubens*, from which it differs only in its hairy perianth. It may be only a variety of that species ranging on the volcanic hills of eastern Chihuahua.

Eriogonum ciliatum Torr. Bot. Mex. Bound. 175 (1859).

COAHUILA: Buena Vista, fl. dark purple, May 19, 1849, *Gregg 83*; mountains 6 mi. east of Saltillo, July 1880, *Palmer 2088*; San Lorenzo Canyon, southeast of Saltillo, scattered on grassy mesas, not common, fl. bright maroon, Sept. 1904, *Palmer 385*; Carneros Pass, Sept. 4, 1889, *Pringle 2379*; north end of Carneros Pass, 1-3 ft. tall, fl. brownish purple, *Johnston 7287*; 4 km. east of Fraile, mountain-side, fl. purple, *Stanford et al. 359*.

Ranging from southeastern Coahuila and northern Nuevo Leon south to northern San Luis Potosi and southern Tamaulipas. The original material of the species was collected on "sandy soil near Buena Vista" by Edwards and "near Monterrey" by Gregg.

Eriogonum Greggii Torr. & Gray, Proc. Am. Acad. 8: 187 (1870).

Eriogonum ciliatum var. *foliosum* Torr. Bot. Mex. Bound. 175 (1859).

COAHUILA: Rancho Santa Teresa, south of Castaños, *Wynd & Mueller 181*; Puerto San Lazaro, open grassy slopes, *Muller 3073*; Saltillo, stony hillside, May 1898, *Palmer 166*; Carneros Pass area, March 1880, *Palmer 1176*; high plain near San Juan de la Vaqueria, fl. purplish, May 20, 1847, *Gregg 719* (TYPE); Sierra Pata Galana, March 1905, *Purpus 1151*.

Known elsewhere about Monterrey and near the Rio Grande in extreme southern Texas.

Eriogonum Abertianum Torr. in Emory, Notes Military Recon. 151 (1848).

Eriogonum pinetorum Greene, Muhl. 6: 3 (1910).

Eriogonum Abertianum var. *neomexicanum* Gand. Compt. Rend. Soc. Bot. Belg. 42: 196 (1906).

Eriogonum Abertianum var. *ruberrimum* Gand. l. c.

CHIHUAHUA: Near Lake Santa Maria, 1899, *Nelson 6395*.

This is a species ranging in northwestern Chihuahua (Casa Grandes, Col. Juarez, and Carretas), Sonora, Arizona, and western New Mexico. It is a slender erect plant, usually simple below but with forking cymose-paniculate branches above the middle. Its range approaches that of the more eastern and southern *E. cyclosepalum*, a species confused with it, only in northwestern Chihuahua and in the Rio Grande Valley near El Paso.

Eriogonum Abertianum var. *villosum* Fosb. Madroño 4: 191 (1938).

This plant has been collected near El Paso, Texas (Jones, Thurber). Doubtless it occurs in adjacent Chihuahua. The collection distributed by Gray as *Wright 1762* is a mixture of typical *E. cyclosepalum* and *E. Abertianum* var. *villosum* and is composed of material collected by Charles Wright on March 21, 1852, in the Rio Grande Valley south of the Quitman Mts., and on April 19, 1852, on the "foothills towards Lake Santa Maria." Of this mixture I suspect that the latter Chihuahuan material is that representing *E. Abertianum* var. *villosum*.

I am unable to determine whether var. *villosum* is merely a vernal phase of *E. Abertianum* or perhaps even a distinct species. It has roughly the same distribution as *E. Abertianum*, but it appears to be a much coarser, more hairy, and more spreading plant with coarser more-flowered involucre and more elongate peduncles. It rarely shows the forking open branching of true *E. Abertianum*, and its leaves are thicker and never so strongly reduced up the stem. Var. *villosum* strongly suggests the vernal forms

of *E. cyclosepalum* but is quickly distinguished by its very elongate peduncles, smaller paler flowers, and short involucre-lobes.

Eriogonum cyclosepalum Greene, Muhl. 6: 1 (1910).

Eriogonum lappulaceum Greene, Muhl. 6: 2 (1910).

Eriogonum Abertianum subsp. *lappulaceum* Stokes, Gen. Eriogonum 37 (1936).

Eriogonum Abertianum var. *cyclosepalum* Fosb. Madroño 4: 192 (1938).

Eriogonum Abertianum var. *lappulaceum* Fosb. Madroño 4: 193 (1938).

Eriogonum Abertianum var. *bracteatum* Fosb. Madroño 4: 192 (1938).

COAHUILA: Between Santo Domingo and Piedra Blanca, Wynd & Mueller 495; Picachos Colorados, Johnston & Muller 126; south base of Sierra Hechiceros, near El Tule, Stewart 538; Castillon, Stewart 386; near Santa Elena, Stewart 309; Cañon Tinaja Blanca, Sierra Cruces, Stewart 580, 2258; near Norias, 24 mi. north of Esmeralda, Johnston & Muller 333; valley west of Bufido, Johnston & Muller 845a; 3 mi. west of San Antonio de los Alamos, Johnston & Muller 860. CHIHUAHUA: 5 mi. southeast of San Carlos, Johnston & Muller 85; 4 km. south of Rancho Hechiceros, Stewart 213; road to Chihuahua, south of Carrizal, Aug. 21, 1846, Wislizenus 127; near Chihuahua, 1908, Palmer 25; plain near silver mill, Chihuahua, Aug. 4, 1885, Pringle 681; 11 mi. northeast of Camargo, Johnston 7891; 3 mi. west of Piloncillo, Johnston 7859.

Frequent in valleys and foothills, in silty or sandy soils. Growing among grass, under bushes, or in bare open places. The plant ranges from trans-Pecos Texas south through Coahuila and eastern Chihuahua to San Luis Potosi. In the past it has been confused with the more northerly and western *E. Abertianum*, but it may be readily distinguished by its more compact lower growth-habit, its strict usually rather numerous stems bearing racemosely disposed involucre, its elongate involucre-lobes, and its slightly larger yellow or yellowish more or less conspicuously red-tinged perianth-lobes.

In his recent study of this group Fosberg treated our plants as varieties of *E. Abertianum*, referring the vernal forms to var. *cyclosepalum* and the summer phases to var. *bracteatum*. I do not believe such seasonal forms merit nomenclatorial recognition. Fosberg's *E. Abertianum* var. *Gillespiei* is a plant of Maricopa and Pinal Counties, Arizona, which appears to be an outlying isolated population related much more closely to *E. cyclosepalum* than to *E. Abertianum* and which I believe should be called *E. cyclosepalum* var. *Gillespiei* (Fosb.) comb. nov.

Eriogonum annuum Nutt. Trans. Am. Philos. Soc. 5: 164 (1837).

CHIHUAHUA: Dunes south of Salamayuca, Sept. 20, 1886, Pringle 798; Los Medanos, 1935, LeSueur 414; near Carrizal, sandhills, Aug. 18, 1846, Wislizenus 104; sandhills near Cantarrecio, Oct. 1852, Thurber 819.

A plant of sandy soils, ranging from northern Chihuahua north to the central United States.

Eriogonum polycladon Benth. in DC. Prodr. 14: 16 (1856).

CHIHUAHUA: 5 km. north of Escobillas, rocky slopes, frequent, fl. reddish, Stewart 2373; Chihuahua, ex herb. Scheer [Potts].

Arizona to trans-Pecos Texas (Davis Mts.) and south into Chihuahua and Sonora. The species has been collected repeatedly in the highlands of western Chihuahua and northern Sonora. Pringle is listed as having collected the species near Chihuahua (no. 644). Potts' material may have come from near Chihuahua City or from the mountains to the west. Mr.

Stewart's collection comes from the extreme northeastern part of the state.

Eriogonum rotundifolium Benth. in DC. Prodr. 14: 21 (1856).

VERNACULAR NAME: Chuchaca.

COAHUILA: 10 km. west of San Guillermo, tobose flat, fl. white, *Stewart 1762*; 9 km. south of El Tule, south base of Sierra Hechiceros, dry hillside, fl. white, *Stewart 451*; Picacho Noche Buena, lava-strewn slope, *Johnston & Muller 166*; Castillon, silty arroyo at margin of gypsum flat, *Johnston & Muller 1274*; south of Laguna Leche, silty flat in somewhat saline and gypseous soil, *Johnston 8623*; near La Rosa, northwest of Saltillo, *Shreve & Tinkham 9906*. CHIHUAHUA: 3 mi. south of Providencia, silty slope, *Johnston & Muller 108*; 11 mi. west of Providencia, silty desert plain, *Johnston & Muller 104*; Rancho El Pino, about 10 km. southeast of Sierra Rica, dry sandy flat, fl. white, *Stewart 2560*; dry hills and mesas near Juarez, May 5, 1901 and Sept. 26, 1902, *Pringle 9444, 11155*.

An associate of *Larrea* on valley slopes and one showing a preference for silty, frequently somewhat gypseous soils. From our area ranging north into Arizona, New Mexico, and trans-Pecos Texas.

Eriogonum Wrightii Benth. in DC. Prodr. 14: 15 (1856).

COAHUILA: Sierra del Carmen, Sept. 7, 1936, *Marsh 806*; Puerto Colorado, crevices in sandstone, globose bush 12–18 inches tall, *Johnston 8696*; Sierra Hechiceros, Cañon Indio Felipe, creek-banks, *Stewart 110*; northern foothills of Sierra Cruces, gravelly open arroyo, bush 1 ft. tall, 2–3 ft. broad, fl. white, *Johnston & Muller 1053*; Cañon Tinaja Blanca, Sierra Cruces, sunny open slopes in upper canyon, erect, shrubby, 1–2 ft. tall, *Johnston & Muller 295*. CHIHUAHUA: 8 km. south of Rancho Hechiceros, in arroyo, fl. white, *Stewart 216*; along Sierra Seca, 20 km. north of Rancho San José del Progreso, rocky slopes, fl. white, *Stewart 2350*; 3 mi. north of Mesteñas, dry rocky slope in canyon, *Johnston 7950*; low ridge a mile southwest of Mesteñas, rocky slope, fl. white, *Stewart & Johnston 2031*. ZACATECAS: Concepcion del Oro, 1902, *Palmer 381*.

Ranging from San Luis Potosi and Zacatecas northward and northwestward into trans-Pecos Texas, New Mexico, and Arizona. The type came from extreme western Pecos County, Texas. The plant usually grows in gravelly or rocky soils and forms an erect bushy mass a foot or more tall.

Eriogonum tenellum Torr. Ann. N. Y. Lyceum 2: 241 (1827).

Eriogonum tenellum var. *leptocladon* Benth. in DC. Prodr. 14: 20 (1856).

VERNACULAR NAMES: Chuchaca; Chacate.

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller 615*; Piedra Blanca, igneous hills, *Wynd & Mueller 499*; Parras, 1880, *Palmer 1173*; Cañon Indio Felipe, Sierra Hechiceros, sides of arroyo, *Stewart 159*; Sierra Cruces, Cañon Tinaja Blanca, rocky side of narrow canyon, *Johnston & Muller 267*; near Santa Elena, rocky hillside, fl. white, *Stewart 570*; San Antonio de los Alamos, crevices in volcanic tuff, *Johnston & Muller 891*. CHIHUAHUA: 14 mi. west of San Carlos, gravelly bed of arroyo, *Johnston & Muller 29*; 4 km. north of Rancho El Pino, southeast of Sierra Rica, rocky slope, fl. white, *Stewart 2424*; Sierra Virulento, rocky bench at base of sierra, *Johnston 8086*; Sierra Encinillas, near Fierro, rocky hillside, fl. white, *Stewart 766*; Los Organos, local on rocky flat, fl. white, *Stewart & Johnston 2056*; Los Organos, 1937, *LeSueur 1310*; rocky hills west of Chihuahua, April 24, 1885, *Pringle 169*; Chihuahua, stony mesas, fl. white, 1908, *Palmer 80*.

Ranging from our area northward through trans-Pecos Texas to western Oklahoma and thence westward in northern New Mexico and southern Colorado. A plant of well-drained, usually rocky or gravelly soil in exposed situations, with a rather compact multicapital caudex, basal clusters of petiolate ovate to broadly orbicular white-tomentose leaves, and naked flowering branches.

Eriogonum tenellum Torr. var. *ramosissimum* Benth. in DC. Prodr. 14: 20 (1856).

CHIHUAHUA: Sierra de los Organos, Sept. 1937, *LeSueur* 2006.

This variety has been previously known only from the igneous area of central Texas (Llano and Gillespie Counties), east of the area from which typical *E. tenellum* is known. From typical *E. tenellum* it differs in having a very much looser caudex with the small acutish ovate leaves scattered along the lower 5–15 cm. of the flowering stem. Its low usually sprawling slender growth-habit, small acutish leaves, and smaller flowers quickly distinguish it from *E. platyphyllum*. Although from far to the southwest of previously known stations of var. *ramosissimum*, LeSueur's collection from the Sierra Organos seems indistinguishable from it, as well as conspicuously different from the material of typical *E. tenellum* which has been collected in the same sierras. The variety may deserve specific rank.

Eriogonum platyphyllum Torr. ex Benth. in DC. Prodr. 14: 20 (1856).

Eriogonum tenellum var. *platyphyllum* Torr. Bot. Mex. Bound. 176 (1859).

COAHUILA: Rancho Agua Dulce, shrub-covered valley floor, 1936, *Wynd & Mueller* 412; Rancho Babia, 1938, *Marsh* 1208; Santa Anna Canyon, July 15, 1936, *Marsh* 489; Soledad, Sept. 1880, *Palmer* 1174; Sierra Guajes, Cañon Milagro, in arroyo, fl. yellowish white, *Stewart* 1537; several miles below Palos Blancos, road between Ocampo and Cuesta Zozaya, gravelly bench on open canyon-floor, *Johnston* 9264.

Ranging from our area north into the Big Bend and along the south escarpments of the Edwards Plateau (mouth of Terlingua Creek, *Havard* 114; southwest of Langtry, *Cory* 19414; 10 mi. west of Laguna, Kinney Co., *Cory* 29317; and Nueces River west of Uvalde, *Wright* 618, type). Although obviously related to *E. tenellum*, its elongate erect shrubby very leafy stems and larger flowers readily distinguish it from that more westerly ranging species.

Eriogonum Jamesii Benth. in DC. Prodr. 14: 7 (1856).

Eriogonum undulatum Benth. in DC. Prodr. 14: 7 (1856).

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller* 616; Sierra del Carmen, Aug. 9, 1936, *Marsh* 688; Mesa Grande, northwest of Hac. Encantada, fl. whitish, *Stewart* 1650; crest of Sierra Encantada, fl. reddish, *Stewart* 1460; betw. south end of Hillcoat Mesa and Buena Vista headquarters, July 27, 1938, *Marsh* 1495; Sierra Gloria, 1939, *Marsh* 1918; Lerios, July 1880, *Palmer* 1172; 3 km. southwest of Fraile, in arroyo, fl. white, *Stanford et al.* 335; Sierra del Pino, rocky places along high arid crest, *Johnston & Muller* 554; western escarpment of Potrero de la Mula, sunny ridge below crest, *Johnston* 9242; Sierra Madera, Cañon Pajarito, dry arroyo banks, fl. greenish white tinged with red, *Muller* 3186; Sierra Madera, Cañon Charretera, opening in oak-chaparral, rocky canyon floor, *Johnston* 9004; Sierra Hechiceros, Cañon Indio Felipe, crevices of cliffs, *Stewart* 82; Sierra Hechiceros, Cañon Madera, sunny ledges on cliffs, *Johnston & Muller* 1296; Picacho Noche Buena, lava cliffs, *Johnston & Muller* 181; Sierra Cruces, near Santa Elena, sandy arroyo, fl. white, *Stewart* 311; highest peaks of Sierra Cruces, rocky slopes, *Stewart* 1143; San Antonio de los Alamos, crevices about summit of tuff cliffs, *Johnston & Muller* 951; Sierra Parras, July 1910, *Purpus* 4606; Sierras Negras, 9 km. south of Parras, fl. white, *Stanford et al.* 162; Picacho de Jimulco, summit, *Stanford et al.* 95. CHIHUAHUA: Cañon Madera, Sierra Rica, rocky arroyo and sunny slopes, fl. white, *Stewart* 2489, 2541; Los Organos, 1937, *LeSueur* 1309; Cerro Coronel, Chihuahua, Aug. 5, 1885, *Pringle* 680. ZACATECAS: Mountains 18 km. west of Concepcion del Oro, fl. white, *Stanford et al.* 568.

Ranging from Hidalgo along the eastern Sierra Madre into our area and from thence northward to Kansas, Colorado, and Arizona. Growing in well-drained places, along arroyos, in openings in oak-chaparral, and on exposed ledges and cliffs, and varying in habit accordingly. In sheltered places it becomes 3–5 dm. tall and has large leaves frequently grayish with a thin indument on the upper surface. On exposed ledges and about cliffs it is commonly only 1–2 dm. tall and usually has a well-developed trailing woody caudex with russet shreddy bark and crowded small leaves quickly glabrous and bright green above. The various forms of this widely ranging species vary greatly in appearance but the variants are not geographically correlated and seem best dismissed as ecological forms.

Rumex hymenosepalus Torr. Bot. Mex. Bound. 177 (1859).

VERNACULAR NAME: Lengua de Vaca.

CHIHUAHUA: Near Chihuahua, rich moist soil on river bank, 1908, *Palmer* 27.

Ranging from California east to southwestern Wyoming and western Texas, and south into northern Mexico. The species was originally based upon two specimens, *Thurber* 140, from Hueco Tanks northeast of El Paso, and *Wright* 1782, from the western side of the Rio Grande in Dona Ana County, New Mexico, a short distance north of the international boundary.

Rumex altissimus Wood, Class Book ed. 2. 477 (1847).

CHIHUAHUA: Near Chihuahua, by stream, May 28, 1888, *Pringle* 5540.

Ranging in the eastern United States west to the base of the Rockies and south through Texas, New Mexico, and Arizona into northern Mexico.

Rumex mexicanus Meisn. in DC. Prodr. 14: 45 (1856).

COAHUILA: Fraile, common in valley, *Stanford et al.* 275; 3 km. southwest of Fraile, in arroyo, *Stanford et al.* 329. CHIHUAHUA: Presa de Chihuahua, 1936, *LeSueur* 608.

Widely distributed in the United States, south through Arizona and New Mexico, and along the Sierra Madre Occidental into central Mexico. I am unable to distinguish Mexican material from northern plants segregated recently as *R. triangulivalvis* (Dans.) Rech. The Coahuilan specimens cited above are in flower and lack fruit. They may possibly represent *R. Berlandieri* Meisn. of eastern Texas and eastern Mexico.

Rumex violascens Rech. Repert. Sp. Nov. 39: 171 (1936), Field Mus. Publ. Bot. 17: 131. f. 23 (1937).

COAHUILA: Don Martin Dam, *White* 1376; San Lorenzo de la Laguna, 1880, *Palmer* 1182.

Valley of the Rio Grande along our northern limits west, in southern New Mexico and Arizona, into California, and south in Coahuila. The species was described from a large and representative suite of specimens, but no type was designated.

Rumex crispus L. Sp. Pl. 335 (1753).

VERNACULAR NAME: Lengua de Vaca.

COAHUILA: Monclova, *Marsh* 1678; Saltillo, Feb. 20, 1847, *Gregg*; Parras, 1880, *Palmer* 1181. CHIHUAHUA: Presa de Chihuahua, *LeSueur* 605; Chihuahua, common along river and ditches and in low ground, 1908, *Palmer* 97, 223.

A European plant widely established in wet soils in America. It has been repeatedly collected in the Rio Grande Valley below El Paso.

Polygonum coccineum Muhl. ex Willd. Enum. Pl. 1: 428 (1809).

CHIHUAHUA: 3 miles west of Camargo, fl. pink, *White* 2269.

Widely distributed in the United States and ranging south to Central America. The cited collection represents the forma *terrestre* Stanford, *Rhodora* 27: 169 (1925).

Polygonum lapathifolium L. Sp. Pl. 360 (1753).

COAHUILA: Sierra del Carmen, Sept. 8, 1936, *Marsh* 761; Sabinas River near Muzquiz, *Marsh* 402. CHIHUAHUA: Near Chihuahua, moist shady place along river, 1908, *Palmer* 332.

Widely distributed in America; apparently introduced from Europe. It appears to be generally distributed along the Rio Grande at our northern limit.

Polygonum persicarioides H.B.K. Nov. Gen. et Sp. 2: 179 (1818).

Polygonum hydropiperoides Michx. var. *persicarioides* Stanford, *Rhodora* 28: 27 (1926).

COAHUILA: Monclova, *Marsh* 1681; Monclova, edge of river, *White* 1769; Cañon Indio Felipe, Sierra Hechiceros, bank of creek, *Stewart* 95; south base of Sierra Hechiceros, mud at Tanque La Palma, *Johnston & Muller* 1282.

Ranging from southern California to Texas and south through Mexico to South America. The species has been collected in the Rio Grande Valley in the Big Bend.

Polygonum pensylvanicum L. Sp. Pl. 362 (1753).

CHIHUAHUA: Pond just east of Organos, growing in standing water, *Stewart & Johnston* 2049.

Widely distributed in eastern United States and south in Mexico.

Polygonum punctatum Elliot, Bot. S. Car. and Georgia 1: 455 (1817).

COAHUILA: Muzquiz Swamp, Sept. 15, 1936, *Marsh* 931. CHIHUAHUA: Rio Concho at Camargo, *White* 2245.

Widely distributed in America.

Polygonum aviculare L. Sp. Pl. 362 (1753).

COAHUILA: Saltillo, in river bottom, rare, 1898, *Palmer* 570. CHIHUAHUA: Vicinity of Chihuahua, low moist river bottom, prostrate, 1908, *Palmer* 185.

Widely distributed in America as a weed along roads and in gardens.

Polygonum ramosissimum Michx. Fl. Bor. Am. 1: 237 (1803).

Collected in the bottom-lands along the Rio Grande in El Paso (*Wright* 1775) and Hudspeth (*Waterfall* 3968 and 4598) Counties and hence, doubtless, occurring in adjacent Chihuahua. Widely distributed in the United States.

CHENOPODIACEAE

Chenopodium ambrosioides L. Sp. Pl. 219 (1753).

VERNACULAR NAMES: Hipazote; Istafiate.

COAHUILA: Sierra del Carmen, Aug. 9, 1936, *Marsh* 681; Rancho Babia, *Marsh* 1213; La Azufrosa, 3 ft. tall, scarce, 1848, *Gregg* 515; Parras, 1898, *Palmer* 445; San Lorenzo de la Laguna, 1880, *Palmer* 1153.

Widely distributed in America as a weed and a medicinal herb.

Chenopodium dissectum (Moq.) Standl. No. Am. Fl. 21: 26 (1916).

COAHUILA: Saltillo, low places and on top of a stony mountain, odor strong, 1898, *Palmer* 353.

Ranging from Coahuila south to central Mexico.

Chenopodium graveolens Lag. & Rodr. Anal. Cien. Nat. 5: 70 (1802).

Chenopodium incisum Poir. in Lam. Encyc. Suppl. 1: 392 (1811).

VERNACULAR NAMES: Yerba del Zorillo; Colo de Zorillo.

COAHUILA: San Antonio de las Alanzanas, 1-2 ft. tall, scarce, Aug. 31, 1848, *Gregg* 390; Carneros Pass area, Aug. 1880, *Palmer* 1150. CHIHUAHUA: Cañon Madera, Sierra Rica, open sunny slopes, *Stewart* 2459, 2502; canyon west of Organos, along arroyo and under liveoaks, *Stewart & Johnston* 2077; Sierra Santa Eulalia, Oct. 9, 1885, *Pringle* 552.

A native species ranging from trans-Pecos Texas to Arizona and south to Central America. It is sold as a medicinal plant in the market at Chihuahua.

Chenopodium murale L. Sp. Pl. 219 (1753).

COAHUILA: Monclova, 1939, *Marsh* 1728, 1842.

A European weed widely established in America. It has been collected in the bottoms of the Rio Grande near Boquillas, Texas.

Chenopodium Fremontii Wats. Bot. King's Exped. 287 (1871).

COAHUILA: Cañon Indio Felipe, Sierra Hechiceros, abundant at base of talus-slope, *Stewart* 40; Cañon Indio Felipe, dry sandy arroyo, *Stewart* 58; north base of Sierra Cruces, dry open bed of arroyo, *Johnston & Muller* 1051; Tinaja Blanca, Sierra Cruces, sandy arroyo, not common, *Stewart* 317; Carneros Pass, shaded ravines, Sept. 11, 1889, *Pringle* 2308. CHIHUAHUA: Rio Grande, Oct. 1852, *Thurber* 817.

Widely distributed in the western United States and south into northern Mexico. Among the collections cited *Stewart* 40, *Pringle* 2308, and *Thurber* 817 are very similar and clearly conspecific. They represent the loosely branched slender-stemmed plant with thin, green, practically glabrous leaves. Aellen, in Repert. Sp. Nov. 26: 141 (1929), cites *Pringle* 2308 and the very similar *Wright* 570 (from the Rio Grande bottoms below El Paso) as *C. Fremontii*. The other collections which I have cited are much less mature, less branched, somewhat farinose, and lack mature fruit. Their difference may be caused by their immaturity. They may, possibly, be forms transitional to *C. incanum*.

In my identifications of this and the following four species I have tried to follow Aellen, using his "Beitrag zur Systematik der *Chenopodium*-Arten Amerikas," in Repert. Sp. Nov. 26: 31-64, 119-160 (1929), and the "Key and Synopsis of the American Species of *Chenopodium*" by Aellen & Just, in Am. Midl. Nat. 30: 47-76 (1943). The material from the area is scanty and much of it without mature fruits, and very many specimens must be collected and studied before our species can be satisfactorily identified, if, indeed, that will ever be possible in this complex genus.

Chenopodium incanum (Wats.) Heller, Pl. World 1: 23 (1897).

CHIHUAHUA: Vicinity of Chihuahua, old fields and waste places, 1908, *Palmer* 342.

According to Aellen, Repert. Sp. Nov. 26: 144 (1929), the species

ranges in the western United States and south to Zacatecas. He cites the collection of Palmer listed above, as well as a collection of Mearns from White Water on the international boundary in northwestern Chihuahua.

Chenopodium arizonicum Standl. No. Am. Fl. 21: 19 (1916).

COAHUILA: San José, southeast base of Sierra Cruces, basalt hill, rocky slope, *Johnston & Muller 982a*; San Antonio de los Alamos, flats on summit of tuff cliffs, *Johnston 8260*; Parras, 1880, *Palmer 1151*.

Aellen, Repert. Sp. Nov. 26: 120 (1929), cites material of this species from Utah, Arizona, and northern Mexico. He cites *Palmer 310* (1902), from Saltillo, and *Palmer 1151*, which I have cited above. The other collections from Coahuila which I have listed are similar to *Palmer 1151*. The plant suggests a xerophytic form of *C. incanum* with small scarcely angular leaves.

Chenopodium pratericola Rydb. Bull. Torr. Bot. Cl. 39: 310 (1912); Aellen, *Ostenia* 99 (1933).

Chenopodium petiolare var. *leptophylloides* Murr. Bull. Herb. Boiss. II. 4: 994 (1904).

CHIHUAHUA: Near Ortiz, May 26, 1888, *Pringle 1992* (isotype of *C. petiolare* var. *leptophylloides*).

Widely distributed in the western United States according to Aellen, Repert. Sp. Nov. 23: 134 (1929).

Chenopodium leptophyllum Nutt. ex Wats. Proc. Am. Acad. 9: 94 (1874); Aellen, *Ostenia* 99 (1933).

Chenopodium inamoenum Standl. No. Am. Fl. 21: 15 (1916), Bull. Torr. Bot. Cl. 44: 413 (1917).

The type of *C. inamoenum*, which Aellen identifies with the true *C. leptophyllum*, was collected by Mearns near White Water, near the international boundary, in northwestern Chihuahua. Similar plants have been collected in the bottom-lands of the Rio Grande below El Paso.

Meiomeria stellata (Wats.) Standl. No. Am. Fl. 21: 7 (1916).

Chenopodium stellatum Wats. Proc. Am. Acad. 18: 146 (1883).

COAHUILA: Mountains 21 mi. northeast by north of Monclova, Sept. 1880, *Palmer 1155* (TYPE); saline soil on flats 4 mi. west of Cuatro Cienegas, *Johnston 7134*; saline gypsum flat on slope east of Lag. Jaco, *Stewart & Johnston 1956*.

An endemic genus known only from the collections cited. It is a small erect annual herb 1–10 cm. tall, extremely succulent, and abundantly floriferous from the base upward. The plant is simple or, more commonly, with few to many ascending or rarely somewhat decumbent branches from the base. At the two localities where I have seen this plant it grew most abundantly on Upper Cretaceous beds along the contact of gypsum and saline clays. It appears to be a halophytic gypsophile. From the distance and directions given on Palmer's label (data frequently very inaccurate), the type may have been collected near Hermanas, an area where this plant can very well be expected.

Cycloloma atriplicifolium (Spreng.) Coulter, Mem. Torr. Bot. Cl. 5: 143 (1894).

CHIHUAHUA: Los Medanos, Oct. 1935, *LeSueur 383*.

Sandy places in the middle United States south to Arizona and Texas and

into adjoining Mexico. The plant has been collected on the Texan side of the Rio Grande at Santa Helena Canyon.

Atriplex canescens (Pursh) Nutt. Gen. Pl. 1: 197 (1818).

VERNACULAR NAMES: Costilla de Vaca; Saladillo; Chamizo; Cenizo; Huele de Noche.

COAHUILA: Rio Grande Valley near Piedras Negras, April 24, 1900, *Pringle* 8298; vicinity of Encantada Ranch and eastward to the escarpment, July 30, 1938, *Marsh* 2263; west slopes of Sierra del Carmen northeast of Hac. Encantada, arroyo-bank, shrub 15 dm. tall, *Stewart* 1557; Valle de los Guajes, common on grassy flat, shrub 15 dm. tall, *Stewart* 1326; valley near Flores, north of Cuatro Cienegas, in mesquite forest, rare, *Johnston* 8876; Cuatro Cienegas, *Marsh* 2025, 2051, 2067; salt-lands 3 mi. south of Cuatro Cienegas, shrub 2 m. tall, *White* 1918; valley near Mesillas, 2-5 ft., abundant, *Gregg* 522; Saltillo, three plants only, 2½ ft. tall, Sept. 1898, *Palmer* 298, 303; south of Fraile, shrub 3-6 ft., slopes, *Johnston* 7319; La Ventura, *Nelson* 3905, 3924; Cañon Ybarra, Sierra del Pino, arroyo-banks, *Stewart* 1915; east base of Sierra Cruces, 10 km. north of Santa Elena, shrub 10-15 dm. tall, fairly common, *Stewart* 395; 15 km. south of Puerto de San José, rocky hillside, 1-2 m. tall, *Stewart* 842; northwestern end of Sierra Planchada, common on tobosa-flat, shrub 15 dm. tall, *Stewart* 1015; Laguna de Leche, shrub 2 ft. tall, *Muller* 3286; Noria de San Juan, southeast of Laguna Rey, saline flat, 1 m. tall, *Stewart* 3007; 30 mi. south of Sierra Mojada, *Wynd* 762, 772; Parras, June 1880, *Palmer* 1163; plains east of Parras, April 11, 1847, *Gregg*; San Lorenzo de la Laguna, May 1880, *Palmer*. CHIHUAHUA: South end of Sierra Seca, 5 km. south of Rancho San José del Progreso, shrub 1 m. tall, *Stewart* 2308; near Lake Santa Maria, shrub 2-3 ft. tall, *Nelson* 6410; north of the Sand Dunes, *LeSueur* 282; road to Camargo, 33 mi. north of Jimenez, shrub 15 dm., *White* 2183; 9 mi. north of Escalon, shrub 1 m. tall, *White* 2071. DURANGO: Andabazo Creek, May 7, 1847, *Gregg*; plains near Pasaje, *Shreve* 9121. ZACATECAS: Cedros, near cultivated ground, *Kirkwood* 37, 39, 50.

A widely distributed shrub in the western United States; in all parts of trans-Pecos Texas, but in central Texas extending south to the escarpments of the Edwards Plateau. Ranging south through our area to San Luis Potosi. I have seen no material from Tamaulipas or Nuevo Leon. An unobtrusive but widely distributed shrub in Coahuila. It is most common in silty soils, particularly about mogotes, on valley slopes, but it is also frequent along arroyo banks in the lower canyons. In the volcanic grassy areas of eastern Chihuahua it is much less common.

Atriplex prosopidum Johnston, Jour. Arnold Arb. 24: 227 (1943).

COAHUILA: 10 mi. north of Cuatro Cienegas, *Wynd* 742, 744; south of El Oso, rounded bush 2-3 ft. tall, *Johnston* 8877 (TYPE); near Flores, globose bush 1-4 ft. tall, abundant, with *Suaeda*, in mesquite forest, *Johnston* 8875; 12 mi. north of Monclova, bush 3-4 ft. tall, mesquite-covered valley floor, *Johnston* 7187.

Known only from the collections cited above. A plant of silty, somewhat saline and gypseous valley soils. Growing with *Prosopis glandulosa* and usually in company with *Suaeda*. A relative of *A. canescens*, from which it differs in selection of habitat, indument, form of growth, color of herbage, shape of leaves, and size and shape of fruiting bracts.

Atriplex obovata Moq. Chenop. Enum. 61 (1840).

Atriplex Greggii Wats. Proc. Am. Acad. 9: 118 (1874).

COAHUILA: Perros Bravos, 1 ft. tall, abundant, Sept. 20, 1848, *Gregg* 462 (type of *A. Greggii*); valley 8 mi. north of Avalos, saline flats, common, shrub 6-15 inches tall, *Johnston* 7341; 12 mi. north of La Ventura, local, alkaline flat, shrub 12-18 in. tall, *Johnston* 7649; Llano de Guaje, flats near Tanque La India, common, erect globose

bush 6–18 in. tall, *Johnston & Muller* 779; valley floor 3–4 mi. east of Puerto Caballo, frequent, *Johnston* 8318; Laguna de Leche, flats about lake, globose bush 1–2½ ft. tall, *Johnston* 8598; bottom of large valley southeast of Zacatosa, frequent, erect globose bush 10–18 inches tall, *Johnston* 8645; bottom of valley between La Vibora and Matrimonio, common, globose bush 6–24 inches tall, *Johnston* 9331; 2 mi. west of San Vicente, saline gypseous slopes east of Laguna de Jaco, bush 2–4 dm. tall, fairly common, *Stewart & Johnston* 1967; saline flats at southeastern end of Laguna de Jaco, common bush, globose, up to 16 inches tall, *Johnston & Muller* 1083, 1084, 1086. CHIHUAHUA: Barreal, north of Jaco, saline flats, 2–3 dm. tall, *Stewart* 669; north of Sand Dunes, 1935, *LeSueur* 281. ZACATECAS: Cedros, *Lloyd* 83, 132. DURANGO: 3 mi. northeast of Bermejillo, somewhat saline soil on flats, shrub 6–30 inches tall, *Johnston* 7784. SAN LUIS POTOSI: 2 mi. northwest of Cedral, saline flats, 6–12 inches tall, *Johnston* 7598, 7599; San Vicente, *Shreve* 9351; Hacienda del Salada, about 55 km. north-northwest of Cedral, Dec. 24–25, 1827, *Berlandier* 1346 (ISOTYPE).

Ranging from northern San Luis Potosi north through Coahuila and eastern Chihuahua to the valley of the Rio Grande. The type was collected in extreme northern San Luis Potosi. I have listed all the collections of this species which I have seen from Mexico. In Texas the plant has been collected on Tornillo Creek, Chisos Area (*Havard* 103), and near old Fort Quitman (*Cory* 31039). The plant from the vicinity of El Paso and west to southeastern Arizona, usually referred to *A. obovata*, is a greener more slender plant and at least varietally distinct from our Mexican species.

This species grows on evidently saline and gypseous soils, in the company of marked halophytes such as *Suaeda* and *Allenrolfea*, and also on the periodically flooded and desiccated flats on valley-bottoms, where marked halophytes and surface signs of high gypsum and salt contents are absent. In Coahuila *A. obovata* frequently associates with either *A. acanthocarpa* or *A. Stewartii*. It is usually a small rounded bush 2–5 dm. tall. Rarely it reaches a meter in height.

Atriplex acanthocarpa (Torr.) Wats. Proc. Am. Acad. 9: 117 (1894).

VERNACULAR NAME: Quelito.

COAHUILA: Perros Bravos, 3 ft. tall, abundant, Sept. 20, 1848, *Gregg* 459; valley 8 mi. north of Avalos, saline flats, slender shrub 1–3 ft. tall, common, *Johnston* 7334, 7335, 7342; silty plain 20 mi. west of Saltillo, common, decumbent or sprawling, 6–30 inches high, *Johnston* 7666; desert 48 mi. west of Saltillo, saline flats, decumbent, 6–24 inches high, common, *Johnston* 7695; 5 mi. north of Parras, saline flat, *Johnston* 7702; San Lorenzo de la Laguna, May 1880, *Palmer* 473; near Horizonte, *Wynd* 773; Torreon, alkaline areas on plains, about 2 ft. tall, 1898, *Palmer* 473; Bolson de Mapimi [near the Nazas between San Sebastian and San Lorenzo], dry valleys, common, May 11, 1847, *Gregg*; 5 mi. west of Viesca, moderately saline slope, decumbent or clambering, *Johnston* 7738. CHIHUAHUA: Lake Santa Maria, *Nelson* 6409; 8–14 mi. south of Ojinaga, saline and gypseous flats, globose bush 1–3 ft. tall, common, *Johnston & Muller* 1447.

A plant becoming 1–3 ft. tall with usually sprawling or loosely decumbent stems. Frequently clambering in bushes. Usually associated with *A. obovata* and commonly frequenting obviously saline as well as gypseous soils. Frequently associated with *Suaeda*. Included in the species are a group of more or less geographical races which have not been named. These range in southeastern Arizona, southern New Mexico, along the Rio Grande Valley in trans-Pecos Texas, and southern Texas, and thence south into Tamaulipas and through our area into northern Zacatecas and

northeastern Durango. *Atriplex Pringlei* Standl., of northern and eastern San Luis Potosi, is the southernmost member of this complex. The typical forms of *A. acanthocarpa*, growing in the valley of the Rio Grande above the Big Bend, are more shrubby and apparently more erect and have firmer broader less lobed paler leaves than the plant of southern Coahuila. The plant of southern Texas has very slender stems and narrower, thinner, greener, nearly entire leaves. In the middle western parts of Coahuila *A. acanthocarpa* appears to be replaced by the closely related *A. Stewartii*. The northern limit of *A. acanthocarpa* has not been established in Durango and southern Coahuila. The species will doubtless be found in the saline valleys of northeastern Chihuahua north of the Conchos, when that area is explored.

Atriplex Stewartii Johnston, Jour. Arnold Arb. 22: 110 (1941).

COAHUILA: Llano de Guaje near Tanque La India, common about margin of flats, erect bush up to 18 inches tall, *Johnston & Muller* 781; Llano de Guaje, near Tanque La India, growing among low bushes and partially supported by them, stems 3 ft. long, *Johnston & Muller* 785; Llano de Guaje, edge of flats 10 km. east of Tanque La India, erect bush, common, *Stewart* 1174, 1175; margin of Llano de Guaje at base of Lomas del Aparejo about 3 mi. south of Tanque Aparejo, abundant, erect, 10-16 inches tall, *Johnston & Muller* 777 (TYPE); Laguna de Leche, flats about lake, 1-3 ft. tall, frequent, much browsed, *Johnston* 8592, 8594; near Tanque La Palma, several miles south of Laguna Leche, common on silty flats, 6-12 inches tall, *Johnston* 9331; bottom of large valley southeast of Zacatosa, common on silty flats, *Johnston* 8646, 8647, 8648; silty flats in valley between La Vibora and Matrimonio, erect or somewhat sprawling, 6-12 inches tall, *Johnston* 9332; flats west of Americanos, common, *Johnston* 9387A-D.

Endemic to our area. A plant of heavy silty valley soils subject to periodic floodings and droughts, and usually associated with *A. obovata*. I have not observed the plant in the company of marked halophytes, such as *Suaeda*, nor in soils that are evidently saline. It is frequently erect but commonly is decumbent or sprawling or scrambling in low bushes, and is rarely more than 3-4 dm. tall. It is usually much more browsed than its companion species, *A. obovata*.

The plant has the growth-habit and vegetative characters of *A. acanthocarpa*, but differs from that related species in having the fruit regularly 4-winged rather than covered with irregularly arranged appendages. It replaces *A. acanthocarpa* in western middle Coahuila. How the species behaves as it approaches the area in which *A. acanthocarpa* grows is unknown. Unfortunately I have no good fruiting material of these plants from such strategic areas as Cuatro Ciénegas, Laguna del Rey, Laguna Palomas, Valle Acatita, or Valle de las Delicias. I have one fruiting specimen from the saline flats 4 miles west of Cuatro Ciénegas (*Johnston* 7136), which possibly may be referable to *A. Stewartii*, though this seems doubtful. The habitat near Cuatro Ciénegas is very saline and more in accord with the known soil preference of *A. acanthocarpa*.

Atriplex reptans Johnston, Jour. Arnold Arb. 22: 111 (1941).

COAHUILA: Saline gypseous flat east of Laguna del Jaco, locally abundant, *Johnston & Muller* 1080, 1081 (TYPE), *Stewart & Johnston* 1975. SAN LUIS POTOSI: Santo Domingo, 1934, *Lundell* 5584.

A species known only from the two localities cited above. A creeping perennial with very small crowded opposite leaves. At the type locality, on the slope east of Lake Jaco, 3 miles west of San Vicente, the plant is locally abundant on a gypsum flat which catches the drainage flowing down the slope over extensive exposures of saline and gypseous clays.

Atriplex monilifera Wats. Proc. Am. Acad. 9: 111 (1874).

Endolepis monilifera Standl. No. Am. Fl. 21: 73 (1916).

VERNACULAR NAME: Quelito.

COAHUILA: Dried up lake-bed in Bolson de Mapimi, April 13, 1847, *Gregg* (TYPE); Laguna de Viesca, alkaline soil about lake-bed, *Johnston* 7732.

A very distinct endemic annual species. The type was collected about the south margin of Laguna de Mayran.

Atriplex abata Johnston, Jour. Arnold Arb. 21: 67 (1940).

COAHUILA: 11 miles north of La Ventura, common locally on alkaline flat, prostrate, *Johnston* 7648. SAN LUIS POTOSI: San Miguel, alkaline flat, prostrate, *Johnston* 7617 (TYPE).

A prostrate annual species related to *A. elegans*. It is known only from the stations cited above in southern Coahuila and adjoining northern San Luis Potosi.

Atriplex argentea Nutt. Gen. Pl. 1: 198 (1818).

Atriplex expansa Wats. Proc. Am. Acad. 9: 116 (1874).

CHIHUAHUA: Juarez, valley of the Rio Grande, Sept. 8, 1888, *Pringle* 1996.

A weedy annual species widely distributed in the western United States.

Atriplex elegans (Moq.) Dietr. Synop. 5: 537 (1852).

Obione elegans var. *radiata* Torr. Bot. Mex. Bound. 183 (1859).

CHIHUAHUA: Plains near Chihuahua, Aug. 28, 1885, *Pringle* 670; Rio Santa Maria east of Corralitos, Aug. 1852, *Thurber* 715.

Ranging from western Texas to California and south into Sonora and Chihuahua. It has been repeatedly collected on the Texan bank of the river in the Rio Grande Valley below El Paso.

Atriplex texana Wats. Proc. Am. Acad. 9: 113 (1874).

Obione elegans var. *tuberculosa* Torr. Bot. Mex. Bound. 133 (1859).

COAHUILA: 4 mi. southwest of Hermanas, saline flats south of Rio Salado, *Johnston* 7075; Cuatro Cienegas, 1939, *Marsh* 2040; 9 mi. east of Cuatro Cienegas, saline soil near road, *Johnston* 7106.

Extending westward into our area from southern Texas.

Atriplex muricata Humb. & Bonpl. ex Willd. Sp. Pl. 4: 959 (1806).

Atriplex glomerata Wats. ex Standl. No. Am. Fl. 21: 54 (1916), Bull. Torr. Bot. Cl. 44: 424 (1917).

VERNACULAR NAME: Quelitillo.

COAHUILA: Castillon, prostrate mats about corrals, *Johnston & Muller* 1272; Cuatro Cienegas, 1939, *Marsh* 2015; 7 mi. south of Hipolito, heavy soil on desert plain, *Johnston* 7244; Saltillo, Sept. 1898, *Palmer* 290; Parras, April 1880, *Palmer* 1156 (isotype of *A. glomerata*); La Punta, 6 mi. south of Fraile, silty valley bottom, *Johnston* 7321. ZACATECAS: Between San Tiburcio and Cardona, valley floor, *Johnston* 7369.

Extending north into our area from central Mexico. A prostrate plant with dentate oblanceolate leaves.

Atriplex semibaccata R. Br. Prodr. 406 (1810).

COAHUILA: Saltillo, roadside, 1939, *Frye & Frye* 2496.

An Australian species, first introduced as a forage plant and now widely established from California to Texas.

Eurotia lanata (Pursh) Moq. Chenop. Enum. 81 (1840).

COAHUILA: Carneros Pass area, July 1880, *Palmer* 1164; valley just southwest of Carneros Pass, frequent bush 1-3 ft. tall, valley floor, *Johnston* 7300; 10 mi. south of Carneros Pass, common bush in valley, 2-3 ft. tall, *Johnston* 7652; between Agua Nueva and Encarnacion, shrub 5 ft. tall, Dec. 15, 1848, *Gregg* 560.

This shrub has been collected in the high country of northern Chihuahua but otherwise is known from Mexico only in the valleys just south of Carneros Pass. Our plants belong to var. *subspinosa* (Rydb.) Kearney. It is widely distributed in the western United States.

Bassia hyssopifolia (Pallas) Kuntze, Rev. Gen. 1: 547 (1891).

An Asiatic herb now widely established in trans-Pecos Texas and southern New Mexico. It has been collected along the Rio Grande above and below El Paso and is most certainly to be expected in adjoining northern Chihuahua.

Corispermum nitidum Kit. in Schultes, Oesterr. Fl. ed. 2. 1: 7 (1814).

CHIHUAHUA: Los Medanos, 1935, *LeSueur* 285; Cantarrecio, Oct. 1852, sand hills, *Thurber* 811.

Widely distributed in sandy places in the middle United States and south to Texas and Arizona.

Allenrolfea occidentalis (Wats.) Kuntze, Rev. Gen. 2: 546 (1891).

COAHUILA: Cuatro Cienegas, *Marsh* 2077; 3 mi. south of Cuatro Cienegas, low shrub on salt-lands, *White* 1915; 4 mi. west of Cuatro Cienegas, abundant bush 1-4 ft. tall on saline flats, *Johnston* 7139; Laguna de Jaco, succulent usually decumbent bush becoming 4 ft. tall, salt flats at south end of lake, *Johnston & Muller* 1084; Laguna del Rey, common on saline flats, 1 dm. tall, *Stewart* 3024; Parras, 1880, *Palmer* 1166; Laguna Viesca, 7 mi. northeast of Viesca, shrub 4-7 ft. tall on saline flat, *Johnston* 7733; just west of Viesca, saline soil, decumbent, 12-16 inches tall, locally abundant, *Johnston* 7737.

A leafless very succulent bush growing only in very saline soils with a perennial source of subsurface water. Widely distributed in the western United States. The plant has been collected in the Rio Grande Valley below El Paso and is doubtless present also in northern Chihuahua.

Suaeda mexicana Standl. Field Mus. Publ. Bot. 4: 203 (1929).

COAHUILA: 3 mi. west of Cuatro Cienegas, saline flat, 1-4 ft. tall, *Johnston* 7127; 1 mi. west of Anteojo, west of Cuatro Cienegas, gypsiferous saline clays near foot of gentle slope, plant erect, pale green, 1-3 ft. tall, *Johnston* 8870; Cuatro Cienegas, 1937, *Marsh* 2071; salt-lands 3 mi. south of Cuatro Cienegas, 1939, *White* 1917. SAN LUIS POTOSI: Hacienda Angostura, alkaline plain near San Bartolo Station, July 15, 1891, *Pringle* 3788 (ISOTYPE).

A glabrous pale green plant 1-4 ft. tall, mostly branched at the base and with numerous erect elongate stems. It appears to be a halophytic gypso-philic. It is one of a number of species known from the saline gypseous plains near Cuatro Cienegas and elsewhere only from the similar habitats on Hacienda Angostura in eastern San Luis Potosi.

Suaeda jacoensis Johnston, Jour. Arnold Arb. 24: 228 (1943).

COAHUILA: Salt-flats at southeast end of Laguna de Jaco, frequent, light green, erect, none seen over 1 ft. tall, *Johnston & Muller 1087*; Laguna de Jaco, salt flats at southeast end of lake, fairly common, erect, 1-3 dm. tall, *Stewart & Johnston 1975* (TYPE), 1976.

A plant less than 1 ft. tall, with numerous subsimple slender stems arising from a branched base. The root may become coarse, woody, and obviously long-persistent, but most of the plants seen appeared to be annuals. The species is related to *S. mexicana*, from which it differs in shorter more slender usually purplish and somewhat verrucose stems and irregularly cristate and keeled mature calyx-lobes. It grows in somewhat gypseous very saline soil and is known only from the type-locality.

Suaeda Palmeri (Standl.) Standl. Field Mus. Publ. Bot. 8: 10 (1930).

Dondia Palmeri Standl. No. Am. Fl. 21: 91 (1916).

VERNACULAR NAMES: Saladillo; Jaboncillo.

COAHUILA: Hermanas, 1939, *Marsh 1641*; 4 mi. west of Cuatro Cienegas, common bush on saline flats, erect, 1-3 ft. tall, *Johnston 7138*; Divisadero, about 11 mi. west of Cuatro Cienegas, a common bush on flats and on the long gentle slopes nearly up to the base of the mountains, confined to saline gypseous clays, *Johnston 8864*; near Cienega Grande, May 18, 1847, *Gregg*; 3 km. southeast of Las Margaritas, Valle Delicias, common on flats, 1 m. tall, *Stewart 2950*; Parras, June 1880, *Palmer 1168* (ISOTYPE); 4 mi. north of Peña, alkaline valley-slope, dense bush, 2-4 ft. tall, *Johnston 7719*; valley 8 mi. north of Avalos, saline flats, common bush, 3-5 ft. tall, *Johnston 7339*. ZACATECAS: Cedros, 1908, *Lloyd 133*.

A bush 1-5 ft. tall, with a woody base and at times a small trunk and distinctly ligneous twiggy ascending branches. It is frequently a common shrub over large areas, and where it has been seen it is characteristic of silty saline and gypsiferous soils. It is not an ordinary halophyte and is not confined to flats where soil moisture is readily available. It is frequently very common on dry silty slopes and in dry valleys below exposures of Upper Cretaceous shales and clays.

Suaeda nigrescens Johnston, Jour. Arnold Arb. 24: 228 (1943).

COAHUILA: 4 mi. southwest of Hermanas, saline flats south of the Rio Salado, *Johnston 7074*; valley 8 mi. north of Avalos, saline flats, *Johnston 7340*; 12 mi. north of La Ventura, common on saline flats, bush 1-2 ft. tall, *Johnston 7650* (TYPE).

Saline flats of eastern Coahuila south to northern San Luis Potosi. A dark green plant with slender much branched decumbent or ascending stems. The branchlets are covered with a minute brownish pubescence.

Suaeda nigrescens var. *glabra* Johnston, Jour. Arnold Arb. 24: 229 (1943).

COAHUILA: Laguna del Rey, saline flats, common, *Stewart 3023*; about 30 mi. south of Sierra Mojada, 1937, *Wynd 771*. CHIHUAHUA: Meoqui, 1935, *LeSueur 197*.

Ranging from western Coahuila and eastern Chihuahua north into trans-Pecos Texas (Rio Grande Valley) and southern New Mexico, and apparently also in southeastern Texas. Differing from typical *S. nigrescens* in having glabrous and more or less glaucous branchlets.

Suaeda suffrutescens Wats. Proc. Am. Acad. 9: 88 (1874).

COAHUILA: Saline gently sloping plain between San Vicente and Laguna de Jaco, decumbent perennial, *Johnston & Muller 1071*; south end of Laguna Jaco, saline flats,

decumbent, *Johnston & Muller 1082*; Americanos, apparently saline flat at base of gypsum beds, 1-2 ft. tall, branches numerous, at first ascending but in old age more or less sprawling, cortex of perennial root black, *Johnston 9386*; south of Laguna Leche, saline gypseous soil, erect or ascending, 1-3 ft. tall, grayish, *Johnston 8269*. CHIHUAHUA: Near Juarez, Aug. 28, 1886, *Pringle 1144*; 5-8 mi. south of Ojinaga, outwash from saline and gypseous clay-banks, *Johnston & Muller 1449*, *Johnston 8001*.

The common and widely distributed *Suaeda* in trans-Pecos Texas, ranging north along the Pecos and Rio Grande into southern New Mexico, and extending south into eastern Chihuahua and western Coahuila. If not restricted to saline gypseous soils it at least appears to favor that substratum.

Suaeda suffrutescens var. *detonsa* Johnston, Jour. Arnold Arb. 24: 230 (1943).

VERNACULAR NAME: Saladillo.

COAHUILA: 3 mi. west of Cuatro Cienegas, saline gypseous flat, loosely and widely branched, 1-5 ft. tall, *Johnston 7128* (TYPE); 3 mi. south of Cuatro Cienegas, salt-lands, low shrub, *White 1913*; Cuatro Cienegas, *Marsh 2042*; Perros Bravos, shrubby, 3 ft. tall, abundant, Sept. 20, 1848, *Gregg 458*; Saltillo, July 1880, *Palmer 1167*; 5 mi. west of Viesca, saline and probably gypseous slope, erect, *Johnston 7739*. DURANGO: Bolson de Mapimi (Rio Nazas to Mapimi), April 15, 1847, *Gregg 449*.

Known only from our area. Differing from typical *S. suffrutescens* in having the leaves green and glabrous, rather than pubescent and gray. It appears to be a larger and more widely branched bush, growing in the area to the south and southeast of that occupied by typical *S. suffrutescens*. Gregg reports that its ashes are rich in alkali and are used in soap-making.

Salsola Kali L. var. *tenuifolia* Tausch, Flora 11: 326 (1828).

Loesener, Repert. Sp. Nov. 16: 201 (1919), reports that Endlich, no. 241, collected this plant between Mapimi and Ojuela, Durango, sometime during the period 1903-1906. I have seen no specimens from the area. The plant is such a common weed along roadsides and in fields in southern New Mexico and in the Rio Grande valleys below El Paso that it must also be present in adjoining Chihuahua.

AMARANTHACEAE

Celosia Palmeri Wats. Proc. Am. Acad. 18: 143 (1883).

COAHUILA: Santa Anna Canyon, July 15, 1936, *Marsh*; 12 mi. north of Monclova, under bushes on silty valley soil in mesquite-thicket, stems straight, spreading or nearly erect, *Johnston 7191*; Monclova, Aug. 1880, *Palmer 1148* (TYPE).

Known only from eastern Coahuila.

Amaranthus Berlandieri (Moq.) Uline & Bray, Bot. Gaz. 19: 268 (1894).

COAHUILA: On plain a mile southeast of Ocampo, one plant near a mogote, *Johnston 8886A*.

Ranging in central and southern Texas south into adjacent northeastern Mexico.

Amaranthus Warnockii sp. nov.

Herba parva glabra viridis 5-20 (raro ad 30) cm. alta basi ramosa; ramis 1-5 decumbentibus ascendentibus vel erectis pallidis 1-4 mm. crassis simplicibus vel ascendenter ramosis; foliis numerosis oblanceolatis longe petiolatis, lamina haud crassa 1-3.5 cm. longa 5-10 mm. lata medium versus vel

paullo supra medium latiore deinde basim versus in petiolum (lamina brevior vel subaequilongum) 1–3 cm. longum gradatim attenuata, subtus pallidior minute albo-tuberculata, nervis pinnatis utrinque 5 vel 6 pallidis ascendentibus prominulis margines laminae haud attingentibus donata, margine plana vel perinconspicue crispa et albo-marginata; cymis bisexualis densis parvis 2–8 mm. longis subsessilibus, imam ad basim caulium conspicue aggregatis, alibi 1 vel 2 in axillis foliorum enatis, ramis cymae congestis rigidis flexuosis strictis bracteosis cartilagineo-incrassatis cum fructibus persistentibus tarde deciduis; floribus masculis paucis basi cymae gestis sessilibus mox deciduis, lobis 5 oblanceolatis ad 1.5 mm. longis haud induratis, filamentis 3 vel 4 ad 1.4 mm. longis, antheris 0.9 mm. longis oblongis; floribus femineis sessilibus pluribus, lobis perianthii 5 spathulato-oblanceolatis 1–1.5 mm. longis infra medium incrassatis pallidis supra medium in lamina ca. 0.5 mm. lata viridi margine conspicue albo-scariosa dilatatis; utriculis maturis compressis indehiscentibus persistentibus 1–1.2 mm. longis 0.8–0.9 mm. latis tuberculatis vel raro sublevibus in ambitu ovato-orbiculatis, stylis 2 raro 3 ca. 1 mm. longis infra medium incrassatis; seminibus brunneis sublevibus.

COAHUILA: 12 mi. north of Monclova, silty valley floor in mesquite thicket, *Johnston* 7076; 1 mi. southeast of Ocampo, silty plain near mogote, *Johnston* 8886 (TYPE, Gray Herb.); valley floor east of Puerto Caballo, dried bed of ephemeral charco, *Johnston* 8329; a mile west of Bufido, silty valley slope, *Johnston & Muller* 844; west of San Rafael, north base of Sierra Cruces, silty valley flat, *Johnston & Muller* 1039A; 10 mi. south of Jaco, silty flat by mogote, *Johnston & Muller* 1124. DURANGO: Near Coahuilan boundary, 31 mi. north of Zaragoza, silty valley soil, *Shreve* 8828. TEXAS: Baldy Peak, Glass Mts., Brewster Co., abundant locally in a sheep-pen tract on lower slopes, July 4, 1940, *Warnock* 14.

Known only from our area and from a single collection in trans-Pecos Texas. A small decumbent or sprawling annual herb of silty valley soils and particularly of those places temporarily flooded after rains. It usually is locally common in open places, frequently near mogotes but not in their shade. I noted but did not collect the species just north of Zenzontle, Coahuila.

The species is evidently a close relative of *A. crassipes* Schlechtend. of Florida and the West Indies. The present plant of northern Mexico and trans-Pecos Texas differs from *A. crassipes* in its elongate somewhat thinner leaves, oblanceolate rather than ovate leaf-blades, less elongate and more slender (never long and trailing) stems, and smaller more compact cymes conspicuously crowded at the base of the stems. Among the Texan and Mexican species *A. Warnockii* can be confused only with *A. scleropoides* Uline & Bray, of central parts of Texas east of the Pecos. That latter species has leaves similar to those of *A. Warnockii* in form, texture, and size, but it differs in having regularly 3 styles, a circumscissile rather than indehiscent utricle, more obese cyme-branches, and cymes that are rarely conspicuously aggregated at the stem-bases. Furthermore, *A. scleropoides* is usually an erect herb, while *A. Warnockii* is decumbent or nearly prostrate or rarely with only the primary stem erect.

With this species it is a pleasure to associate the name of Barton H. Warnock of Alpine, Texas. His many collections from Brewster County,

Texas, deposited at the Gray Herbarium, have been very useful in the preparation of this series of papers. Especially interesting are his numerous collections from the Glass Mts., which have revealed that area as the northern limit of many characteristic plants of western Coahuila.

Amaranthus Torreyi (Gray) Benth. ex Wats. Bot. Calif. 2: 42 (1880).

Amblogyne Torreyi Gray, Proc. Am. Acad. 5: 167 (1861).

Sarratia Berlandieri var. *emarginata* Torr. Bot. Mex. Bound. 179 (1859).

Amaranthus Pringlei Wats. Proc. Am. Acad. 22: 476 (1887).

Amaranthus Bigelovii Uline & Bray, Bot. Gaz. 19: 271 (1894).

Amaranthus Bigelovii var. *emarginata* (Torr.) Uline & Bray, Bot. Gaz. 19: 271 (1894).

COAHUILA: Igneous hill near Santo Domingo, Wynd & Mueller 478; San Antonio de los Alamos, arroyo at base of cliffs, Johnston & Muller 847; north base of Sierra Cruces, arroyo-bank, Johnston & Muller 1045; Sierra Cruces, Cañon Tinaja Blanca, under ledge in canyon, Johnston & Muller 233; San José, southeast of Sierra Cruces, slope of basalt hill, Johnston & Muller 982. CHIHUAHUA: 11 mi. south of Ojinaga, limestone ledge in deep arroyo, Johnston 8038; llano 7 mi. northeast of La Morita, grassy plain, Johnston 7972; hills northwest of Chihuahua, Sept. 26, 1886, Pringle 795 (TYPE).

Ranging from trans-Pecos Texas west to southern Arizona and south into our area. In all recent works this species has been called *A. Pringlei*, but that is properly a synonym of *A. Torreyi*, a name almost universally misapplied to a very different species of sandy soil on the high plains of the middle United States, but actually belonging to our present species. The history of *Amaranthus Torreyi* begins with Gray's enumeration of the plants collected by Xantus in southern Baja California, where the following is published, "100. AMBLOGYNE (SARRATIA) TORREYI. *Sarratia Berlandieri* & var. *emarginata*, Torr. l. c. non Moq.*" The asterisk refers to a footnote on page 169, where the additional notes are given, "4. A. TORREYI (*Sarratia Berlandieri*, cum var. *emarginata*, Torr. l. c., non Moq.): dioica; foliis ovato-oblongis seu oblongo-lanceolatis; glomerulis paniculato-spicatis et axillaribus; bracteis sepalisque masculis cuspidato-acuminatis; sepalis ♀ ima basi coalitis subaequalibus obovato-spathulatis uninerviis, nervo simplici seu leviter pinnatim ramoso, apice rotundato integerrimo retuso vel emarginato. — On the Mexican border from the Rio Grande (Dr. Bigelow, Dr. Parry, etc.) to Lower California, Xantus, supra, no. 100. A variety with linear or oblong-linear leaves and virgate spikes was collected near the sources of the Nebraska, by Mr. Henry Engelmann." Gray seems to be correct in treating *Sarratia Berlandieri* and *S. Berlandieri* var. *emarginata* of Torrey (1859) as conspecific. The first is based upon a collection by Bigelow from Cibolo Creek, at the east end of the Chinati Mts., Texas, and the latter upon material from "Camp Green" collected by Parry, apparently in the Rio Grande Valley somewhere between Lajitas and Boquillas Canyon. Upon these same collections of Bigelow and Parry, Uline & Bray (1894) established *A. Bigelovii* and *A. Bigelovii* var. *emarginata*. In his treatment of the genus, Standley, No. Am. Fl. 21: 109 (1917), recognized *A. Bigelovii* and treated var. *emarginata* as a synonym of it. The Baja California material, Xantus 100, mentioned by Gray when

he published the name *Amblogyne Torreyi*, was subsequently described as *Amaranthus Torreyi* var. *suffruticosus* by Uline & Bray, Bot. Gaz. 19: 272 (1894). This trinomial Standley, No. Am. Fl. 21: 106 (1917), later cited as a synonym of *A. Watsoni* Standl. The collection by Engelmann, mentioned by Gray, is the plant of the middle United States which authors, following Uline & Bray, Bot. Gaz. 19: 272 (1894), and later Standley, No. Am. Fl. 21: 107 (1917), have accepted as true *A. Torreyi*. This seems obviously incorrect, for Gray's comments on Engelmann's collections, as well as his annotations of the collection itself, show he did not consider the specimen typical of his species. The fact that Gray named the species for Torrey and gave great prominence to the Bigelow and Parry specimens treated in Torrey's Botany of the Mexican Boundary shows clearly what he considered the nucleus of his species. Standley, No. Am. Fl. 21: 107 (1917), evidently recognized this fact, for although he applied the name *A. Torreyi* to the plant of the high plains of the middle United States, he cites "*Sarratia Berlandieri* Torr. Bot. Mex. Bound. Survey 179. 1859" as a synonym of *Amaranthus Torreyi* and even gives Cibolo Creek as the type locality of the species.

When Gray published *Amblogyne Torreyi* he gave an ambiguous description and mentioned four collections, one from the Great Plains, one from Baja California, and two from the Rio Grande. The specimen from the Great Plains he obviously considered as atypical of his species. The name he chose for the species, his bibliographic references, and half the total specimens mentioned refer to our present plant, later described as *A. Pringlei* Wats. and *A. Bigelovii* Uline & Bray. Unless these facts are to be ignored and the name applied to the plant of Sonora and Lower California now called *A. Watsoni* Standl., the name *Amaranthus Torreyi* must be applied in the sense here accepted.

Amaranthus Palmeri Wats. Proc. Am. Acad. 12: 274 (1877).

VERNACULAR NAME: Quileto.

COAHUILA: North end of Sierra Cruces, dry open bed of arroyo, erect, up to 6 ft. tall, *Johnston & Muller 1050*; Bolson de Lipanes, between El Almagre and Sierra de Leja, edge of mogote, erect, becoming 5 ft. tall, *Johnston & Muller 1252*. CHIHUAHUA: Grassy plain 7 mi. northeast of La Morita, *Johnston 7972A*; Lake Santa Maria, 1899, *Nelson 6420*; 26 mi. north of Camargo, road to Las Delicias, *White 2288*.

Texas to California and south through Sonora, Chihuahua, and western Coahuila into central Mexico. The only dioecious species of *Amaranthus* known from our area.

Amaranthus hybridus L. Sp. Pl. 990 (1753).

VERNACULAR NAME: Quelito de Cochino.

COAHUILA: Saltillo, common plant in cultivated ground, 1898, *Palmer 421*; Buena-vista, south of Saltillo, frequent, 3 ft. tall, July 24, 1848, *Gregg 283*.

Widely distributed in central Mexico and northward in eastern Mexico into the eastern United States. Usually a coarse plant, a half meter or more in height, and commonly a weed in disturbed ground. The dense, very floriferous, frequently nodding inflorescence is somewhat tawny in color.

Amaranthus Powellii Wats. Proc. Am. Acad. 10: 347 (1875).

COAHUILA: Sierras Negras 9 km. south of Parras, *Stanford et al.* 173. ZACATECAS: Valley 15 km. west of Concepcion del Oro, *Stanford et al.* 505.

Native in the western United States east to Wyoming, Colorado, and trans-Pecos Texas and extending south into northern Mexico, where it has been most frequently collected in the highlands of Chihuahua and Sonora. Closely related to *A. hybridus* and apparently in former times replacing that species in western parts of the continent. At times it is separated from *A. hybridus* with difficulty, but commonly it may be distinguished by being a more slender and lower plant with much simpler less floriferous inflorescences, having stiffer somewhat longer bracts, and a green rather than tawny color.

Amaranthus retroflexus L. var. *salicifolius* var. nov.

A varietate typica differt habitu graciliore, planta saepe 2-6 dm. alta, laminae foliis lanceolatis saepe 3-4-plo latioribus quam latis.

COAHUILA: Parras, 1880, *Palmer* 2043 (TYPE, Gray Herb.); Tanque Jerico, north of Potrero del Fuste, under bushes by tank, *Johnston* 8342A. TEXAS: Chisos Mts., The Basin, common, *Warnock* C647; 7 mi. southwest of Marfa, Presidio Co., 1927, *Cory* 26310; Davis Mts., near Observatory, 1936, *Hinckley*; Glass Mts., infrequent, 1940, *Warnock* 17; 10 mi. northeast of Ft. Stockton, Pecos Co., 1934, *Cory* 9717; 21 mi. north of Ozona, Crockett Co., 1939, *Cory* 32737, 33353; 19 mi. west of Sonora, Sutton Co., *Cory* 37937; 29 mi. southeast of Midland, Midland Co., 1942, *Cory* 40598. ARIZONA: Fort Apache, 1890, *Palmer* 587.

Typical *A. retroflexus* appears to be native in the eastern and southeastern United States, but as an introduced weed it now grows in the western United States as well as in various places in the Old World. In agreement with Standley, Bull. Torr. Bot. Cl. 41: 510 (1914), I have seen no true *A. retroflexus* from Mexico. To the west of what was probably the original range of true *A. retroflexus*, there is found an endemic variety, here called var. *salicifolius*, which occurs in west-central and trans-Pecos Texas and apparently also in eastern Arizona, which does range south into the Mexican state of Coahuila. I have seen no specimens of typical *A. retroflexus* from the parts of western Texas in which var. *salicifolius* has been collected. The variety does not grow as tall or become such a coarse plant as typical *A. retroflexus*. Its chief difference, however, is in the shape of the leaf-blades, which are lanceolate rather than ovate. These are minor differences, but since plants referable to the variety come from a natural geographic area, in which typical *A. retroflexus* appears to be absent, I believe it deserves a name. At times var. *salicifolius* resembles *A. Powellii*, but it may be readily separated from that species by its pallid inflorescence and obtuse or retuse, rather than acute, perianth-lobes.

Amaranthus blitoides Wats. Proc. Am. Acad. 12: 273 (1877).

VERNACULAR NAME: Quelito.

COAHUILA: Sierra del Carmen, Aug. 21, 1936, *Marsh* 559; Hermanas, *Marsh* 2258; La Azufrosa, frequent, Sept. 22, 1848, *Gregg* 516; Perros Bravos, frequent, Sept. 20, 1848, *Gregg* 469; Rancho Gallinas, 6 mi. east of Puertecito, disturbed soil in abandoned labor, prostrate, *Johnston* 8583; 5 mi. west of El Oro, beside railroad on road to Guimbalet, *White* 1999.

A prostrate plant widely distributed in the western United States and northern Mexico.

Acanthochiton Wrightii Torr. in Sitgr. Rep. Explor. 170. t. 13 (1853).

CHIHUAHUA: Cantarrecio, sands, Oct. 1852, *Thurber* 806, 809; Samalayuca, sand-dunes, *LeSueur* 278, 280; sandhills south of Samalayuca, Sept. 20, 1886, *Pringle* 796; Candelaria, sand-dunes, *Shreve* 9033.

A plant of sandy places ranging from El Paso County, Texas, west to Arizona and south into Chihuahua. The plant is dioecious and the male plants are frequently misidentified as representing an *Amaranthus*.

Brayulinea densa (Willd.) Small, Fl. S. E. U. S. 394 (1903).

VERNACULAR NAME: Bola de Hilo.

COAHUILA: Sierra del Carmen, Aug. 9 and 29, 1936, *Marsh* 682, 695; Sierra Hechiceros, Cañon Indio Felipe, sandy soil in arroyo, *Stewart* 48; Sierra Hechiceros, sandy flat east of El Tule, *Stewart* 492. CHIHUAHUA: Near Coahuilan boundary a mile east of Poza de Villa, silty plain, *Johnston* 8178; 20 mi. north of San José del Progreso, sandy slopes, *Stewart* 2351; Sierra Encinillas, near Fierro, sandy hillside, *Stewart* 732; near Mestefías, open rock slope, *Stewart & Johnston* 2030; near Chihuahua, mesas and arroyos, 1908, *Palmer* 196. ZACATECAS: Concepcion del Oro, stony mesas, 1904, *Palmer* 312.

Western Texas to Arizona and south into tropical America.

Froelichia gracilis (Hook.) Moq. in DC. Prodr. 132: 420 (1849).

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller* 647; Muzquiz, *Marsh* 524. CHIHUAHUA: Llano 7 mi. northeast of La Morita, grassy plain, *Johnston* 7973; Chihuahua, 1935, *LeSueur*.

Ranging from Texas to Arizona and south into our area. An annual species with a firm slender root and tuberculate fruit.

Froelichia interrupta (L.) Moq. in DC. Prodr. 132: 421 (1849).

CHIHUAHUA: Chihuahua, 1935, *LeSueur* 55; Meoqui, 1936, *LeSueur* 1050.

The above collections, lacking the base of the stem and the root, appear to represent a phase of *F. interrupta* with elongate tomentose leaves. The mature fruit is not armed laterally. The species ranges from western Texas south through Mexico to South America.

Froelichia arizonica Thornber ex Standl. No. Am. Fl. 21: 128 (1917).

COAHUILA: Sierra del Carmen, Aug. 22, 1936, *Marsh* 580; Yerda Springs, *Marsh* 285; Caracol Mt., Aug. 1880, *Palmer* 1142; Puerto San Lazaro, *Muller* 30491; La Azufrosa, frequent, Sept. 22, 1848, *Gregg* 510; Saltillo, 1898, *Palmer* 572; hills 20 mi. west of Saltillo, *Shreve & Tinkham* 9832; Carneros Pass area, July 1880, *Palmer* 1141; Sierra Encantada, Cañon San Enrique, *Stewart* 1368; Sierra del Pino, Cañon Ybarra, *Stewart* 1878; Sierra del Pino, La Noria, *Johnston & Muller* 475, *Stewart* 1239; Sierra Hechiceros, Cañon Indio Felipe, *Stewart* 51; Picacho de Noche Buena, *Johnston & Muller* 175; Sierra Cruces, 5 km. northeast of Santa Elena, *Stewart* 610; near San José, southeast of Sierra Cruces, *Johnston & Muller* 988; San Antonio de los Alamos, *Johnston & Muller* 929; Sierra Planchada, Cañon Gringo, *Stewart* 1037; Aguaje Pajarito, west end of Sierra Fragua, *Johnston* 8803; 4 mi. west of Cuatro Ciénegas, *Johnston* 7154; Puerto Ventanillas, *Stewart* 2788; 2 km. south of Las Delicias, *Stewart* 2961. CHIHUAHUA: Rancho El Pino, southeast of Sierra Rica, *Stewart* 2412; 12 km. north of San José del Progreso, *Stewart* 2340; Sierra Encinillas, Fierro, *Stewart* 744; Sierra Virulento, east base of sierra, *Johnston* 8079; near Mestefías, *Stewart & Johnston* 2029; 11 mi. northeast of Camargo, *Johnston* 7919.

Dry rocky places on hillsides and along arroyos, in calcareous and volcanic areas. A perennial with a rather fleshy tap-root and one to several strict erect subsimple stems becoming 4–12 dm. tall. The persistent base of the stems becomes somewhat woody and forms a small sparsely and strictly branched caudex. The bracts of the inflorescence are usually black. The stone-like fruiting perianth bears spines or conic protuberances on each side. Ranging from trans-Pecos Texas to Arizona and south into our area.

Tidestromia lanuginosa (Nutt.) Standl. Jour. Wash. Acad. 6: 70 (1916).

COAHUILA: Sierra del Carmen, Sept. 12, 1936, *Marsh 843*; Monclova, *Marsh 1818*; Cuatro Ciénegas, *Marsh 2026*; Mesillas, Sept. 19, 1838, *Gregg 450*; 6 mi. north of La Ventura, *Johnston 7635*; 5 mi. east of Penquitas, road between Santa Elena and Tanque La India, *Johnston & Muller 797*; 2 km. east of San Juan, southwest base of Sierra Cruces, *Stewart 816*; valley-floor east of Puerto Caballo, *Johnston 8334*; Potrero del Cuervo Chico, *Johnston 8577*; 25 mi. east of Americanos, *Wynd 752*; Americanos, *Johnston 9377*; San Lorenzo de la Laguna, 1880, *Palmer*; Torreón, 1898, *Palmer 469*. CHIHUAHUA: 5 mi. south of Ojinaga, *Johnston 8002*; Samalayuca, *LeSueur 279*; sand-hills near Laguna Guzman, *Hartman 727*; Chihuahua, Sept. 27, 1902, *Pringle 11144*; 10 mi. west of El Pozo on road to Santa Eulalia, *White 2446*. ZACATECAS: Cedros, *Kirkwood 114*.

Widely distributed in the southwestern United States and extending south into Tamaulipas, Zacatecas, and Sinaloa. A generally distributed herb in our area, in sandy places, valley silts, and on gypsum, becoming most abundant in disturbed soils.

Tidestromia tenella Johnston, Jour. Arnold Arb. 20: 234 (1939).

COAHUILA: 1 mi. north of Noria San Juan, south of Laguna del Rey, desert flat, plant succulent, yellowish green, *Johnston 7822* (TYPE).

Known only from the type collection. Most closely related to *T. carnosa*, but a smaller and more slender plant with barbellate rather than coarsely branched trichomes. The plant is probably gypsophilous.

Tidestromia carnosa (Steyerm.) Johnston, Jour. Arnold Arb. 24: 232 (1943).

Cladothrix lanuginosa var. *carnosa* Steyerm. Ann. Mo. Bot. Gard. 19: 389 (1932).

CHIHUAHUA: 8 mi. south of Ojinaga, slopes and flats with *Suaeda*, fleshy yellowish green prostrate plant, *Johnston & Muller 1447*; 5½ mi. south of Ojinaga, outwash from saline shales, *Johnston 8003*.

South of Ojinaga confined to outwash from Upper Cretaceous gypseous saline shales and clays. Otherwise known only from Brewster County, Texas, where it grows in geologically similar formations about the base of the Chisos Mts.

Tidestromia suffruticosa (Torr.) Standl. var. *coahuilana* Johnston, Jour. Arnold Arb. 24: 232. 1943.

COAHUILA: Sierra Cruces, 5 mi. north of Santa Elena, *Johnston & Muller 1014* (TYPE); Sierra Cruces, 5 km. west of Picacho San José, *Stewart 820*; Sierra del Pino, Cañon Ybarra, *Stewart 1855*; Lomas del Aparejo, east side of Llano de Guaje, *Johnston & Muller 773*; south end of Sierra del Pino, northeast of Armendais, *Johnston & Muller 362*; west base of the grade over Cuesta Zozaya, *Muller 3287*, *Johnston 9300*; Aguaje Pajarito, west end of Sierra Fragua, *Johnston 8677*; Cañon de Jara, 3 mi. west of Socorro, *Johnston 8844*; Sierra de la Paila, Oct. 1910, *Purpus 4927*.

Growing in dry, rocky, usually moderately gypseous soils along the base

of limestone sierras. Although found in various parts of Coahuila, chiefly western, the plant has a disrupted distribution, perhaps because of special soil requirements. When present the plant is rather common locally. The variety *coahuilana* is known only from Coahuila and is closely related to typical *T. suffruticosa* (Torr.) Standl., of southeastern New Mexico and trans-Pecos Texas, from which it is distinguished by its denser indument, more shrubby stems, and glabrate flowers. Typical *T. suffruticosa* has been collected near Boquillas and Terlingua in the Big Bend area of Texas and can be expected in adjacent northern Coahuila.

Tidestromia gemmata Johnston, Jour. Arnold Arb. 24: 233 (1943).

COAHUILA: South of Matrimonio Viejo, gypsiferous shales, *Johnston 9363* (TYPE); just east of Americanos, cemented gravels capping gypsum, *Johnston 9379*; 20 km. southeast of Rancho Alegre, road to Acatita, common, *Stewart 2668*. TEXAS: Boquillas, Brewster Co., Sept. 4, 1937, *Marsh 310*.

A perennial species strongly simulating the widespread *T. lanuginosa* in general appearance, but quickly distinguished from that annual herb by its coarse root and the conspicuous white woolly buds on its caudex. Known only from the collections listed above. The species is probably gypsophilous.

Tidestromia rhizomatosa Johnston, Jour. Arnold Arb. 24: 233 (1943).

COAHUILA: Saline gypseous flats just east of El Anteojo, west of Cuatro Cienegas, *Johnston 8873* (TYPE).

A prostrate perennial with fleshy more or less reflexed leaves which spreads by slender smooth rhizomes. Known only from the type locality, where it is locally very common.

Gossypianthus lanuginosus (Poir.) Moq. in DC. Prodr. 12²: 337 (1849).

COAHUILA: 12 mi. north of Monclova, silty soil in mesquite thicket, *Johnston 7188*. CHIHUAHUA: Plains near Chihuahua, about railroad shops, Aug. 22, 1885, *Pringle 689*.

Ranging in central and southern Texas south into Tamaulipas, Coahuila, and Chihuahua; West Indies. Frequently confused with *Brayulinea*, but quickly distinguished by its persistent basal rosette of leaves and the bristly upper leaf-surfaces.

Alternanthera repens (L.) Kuntze, Rev. Gen. 2: 536 (1891).

VERNACULAR NAME: Ojo de Pollo.

COAHUILA: Don Martin Dam, *White 1377*; Sierra del Carmen, Aug. 9, 1936, *Marsh 683*; Hac. Encantada, *Stewart 1734*; Saltillo, 1898, *Palmer 562*; Fraile, *Stanford et al. 270*. CHIHUAHUA: Chihuahua, waste-places, river-banks and roadsides, common, 1908, *Palmer 175*; northwest of Chihuahua, Oct. 21, 1885, *Pringle 295*; Bachimba, Nov. 1852, *Thurber 848*. ZACATECAS: Valley 18 km. west of Concepcion del Oro, *Stanford et al. 579*.

A creeping plant frequenting wet soils and disturbed moist places. Ranging from North Carolina to Arizona and south into tropical America.

Gomphrena Haageana Klotzsch, Allg. Gartenz. 21: 297 (1853).

COAHUILA: Muzquiz, *Marsh 14*; Palm Canyon, Muzquiz, *Marsh 371*; Soledad, 1880, *Palmer*; Cañon Bocatoche, common on open grassy valley floor, bracts orange to red, *Muller 3118*.

Ranging in eastern Coahuila and adjacent Texas (Val Verde to Brewster Counties); reported from Nuevo Leon.

Gomphrena decumbens Jacq. Hort. Schoenbr. 4: 41 (1804).

COAHUILA: San Lorenzo Canyon, 6 mi. southeast of Saltillo, prostrate on grassy areas, showy, bracts bright rose-color with white base, 1904, *Palmer 389*. CHIHUAHUA: Chihuahua, edge of river, a few plants only, bracts showy, rose-colored, 1908, *Palmer 189*.

Nuevo Leon and southeastern Coahuila south into central Mexico and South America. Extending north in Durango and Chihuahua, but apparently as an introduced weed.

Gomphrena nitida Rothr. Bot. Wheeler Survey 233 (1878).

COAHUILA: Sierra del Carmen, Sept. 9, 1936, *Marsh 714*; Sierra Hechiceros, Cañon Indio Felipe, dry sandy arroyo, *Stewart 65*; Sierra Cruces, about Tinaja Blanca, sandy arroyo, bracts white to pink, *Stewart 336, 1132, 1948*. CHIHUAHUA: Sierra Hechiceros, Rancho Encampanada, edge of creek, not abundant, pink, *Stewart 198*; 5 mi. north of Escobillas, rocky slopes, frequent, pinkish, *Stewart 2374A*; east base of Sierra Virulento, arroyo bottom, *Johnston 8092*; Sierra de Enmedia, 1890, plains, *Nelson 6471*; Majalca, 1935, *LeSueur 19, 20*; west base of Sierra Santa Eulalia, common on rocky slope, mostly white, *Stewart & Johnston 2109*; rocky hills near Chihuahua, Sept. 1885, *Pringle 315*; Jimenez, Rio Florido, *White 2083*; Parral, 1898, *Goldman 114*.

Trans-Pecos Texas (Chisos and Davis Mts.) through southern New Mexico to southeastern Arizona, and south to central Mexico. The range of this species appears to center in the uplands along the western Sierra Madre.

Dicraurus leptocladius Hook. f. in Benth. & Hook. Gen. Pl. 3: 43 (1880).

COAHUILA: Sierra del Carmen, Sept. 8, 1936, *Marsh 797*; Saltillo, 1898, *Palmer 297*; near Saltillo, Oct. 4, 1905, *Pringle 13604*; Sierra del Pino, Cañon Ybarra, dry hillside, *Stewart 1876*; Sierra Cruces, near Santa Elena, clambering up through bushes to 6 ft., *Johnston & Muller 239, Stewart 278*; Sierra Parras, Aug. 1910, *Purpus 4979*. CHIHUAHUA: Rancho El Pino, southeast of Sierra Rica, sunny slope, *Stewart 2569*; 7 mi. northwest of Temporales de Honorato, supported by bushes in mogote, reaching 25 dm. in height, *Stewart & Johnston 1991*; hills near Chihuahua, Sept. 30 and Oct. 24, 1885, *Pringle 345*; Jimenez, Nov. 1852, *Thurber 840*. DURANGO: Mapimi, Oct. 1898, *Palmer 529*.

A shrubby plant of silty valley soils and of rocky soils on the lower slopes and canyons. Commonly growing up through shrubs and supported by them, attaining one or two meters in height. Ranging from trans-Pecos Texas, chiefly in the Rio Grande Valley, south through our area to Zacatecas and San Luis Potosi.

Iresine heterophylla Standl. Contr. U. S. Nat. Herb. 18: 95 (1916).

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller 526*; Yerda Springs, *Marsh 352*; volcanic hill 2 km. east of Cañon Milagro, east of the Sierra Guajes, hillside, erect, not common, *Stewart 1511*; Saltillo, 1898, *Palmer 288*; Sierra Hechiceros, Cañon Indio Felipe, *Stewart 29, 70, 83*; Sierra Cruces, Cañon Tinaja Blanca, clambering in shrubbery, common, *Stewart 1139*; San Antonio de los Alamos, base of tuff cliffs, *Johnston 8271*. CHIHUAHUA: Sierra Rica, Cañon Madera, shade in canyon, frequent, *Stewart 2521*; rocky hills near Chihuahua, shade of cliffs, Sept. 22, 1885, *Pringle 348*; Bachimba, Nov. 1852, *Thurber 838*.

Western Texas to Arizona and south to central Mexico.

Iresine Calea (Ibáñez) Standl. Contr. U. S. Nat. Herb. 18: 94 (1916).

Iresine laxa Wats. Proc. Am. Acad. 21: 454 (1886).

DURANGO: Sierra Guadalupe canyon about 4 mi. west across the valley of the Aguanaval from Jimulco, April 27, 1885, *Pringle 141* (type of *I. laxa*).

Ranging from northeastern Durango, Sonora, and Baja California south to Costa Rica. Pringle's collection cited above, the type of *I. laxa*, is labeled as from "mountains, Jimulco, Coahuila, April 27, 1885." Pringle's published diaries, however, clearly show that the collection was obtained at the locality I have recorded above.

NYCTAGINACEAE

Selinocarpus chenopodioides Gray, Am. Jour. Sci. II. 15: 262 (1863).

Ammocodon chenopodioides Standl. Jour. Wash. Acad. 6: 631 (1916).

CHIHUAHUA: Pass 10 mi. south of Mula, one plant on alluvial terrace, erect, *Johnston* 8044; Juarez, dry calcareous bluffs, Sept. 26, 1902, *Pringle* 11143; foothills towards Lake Santa Maria, fl. purple, April 9, 1852, *Wright* 1707 in pt.; northwest of Chihuahua, 1935, *LeSueur* 394; Santa Eulalia plains, Aug. 18, 1885, *Wilkinson* (US); plains near Chihuahua, Aug. 15, 1885, *Pringle* 652.

Trans-Pecos Texas (Brewster Co. west) to southern Arizona and south into Chihuahua. An erectly branched herb with tuberous roots.

Another herbaceous *Selinocarpus*, *S. diffusus* Gray, may be found in northern Chihuahua or Coahuila. At the Gray Herbarium there is a collection labeled "Bluffs of Rio Grande, 1881, *Havard* 90." In his published report, *Havard*, Proc. U. S. Nat. Mus. 8: 478 (1885), mentions the species as growing on bluffs along the Rio Grande, presumably in either Presidio or Brewster County, Texas. The species is otherwise known only from Central Texas, northern trans-Pecos Texas, and northwestward through New Mexico.

Selinocarpus angustifolius Torr. Bot. Mex. Bound. 170. t. 47 (1859).

COAHUILA: 2 mi. west of Sacramento, road to Cuatro Ciénegas, rocky hillside, erect shrub 3 ft. tall, *Johnston* 7100; 4 mi. west of Cuatro Ciénegas, mouth of canyon, *Johnston* 7159; hills near Mesillas, shrub 1 ft. tall, Sept. 23, 1848, *Gregg* 535; road to Torreón, 55 mi. west of Saltillo (23 mi. east of Paila), steep rocky sandstone slope, plant strict, erect, 6–24 inches tall, *Johnston* 7699; 14 mi. east of Paila, *Shreve & Tinkham* 9900; Picachos Colorados, rocky soil at base of cliffs, *Johnston & Muller* 136; northwestern foothills of Sierra Cruces, limy mine-dump, shrubby, up to 3 ft. tall, *Johnston & Muller* 1059; Cañon Tinaja Blanca, Sierra Cruces, dry hillsides and cliffs, 1–3 ft. tall, *Stewart* 579, *Johnston & Muller* 277; vicinity of Santa Elena, sides of arroyos, *Stewart* 252, 281; limestone ledges on very arid hills near La Pistola, east side of Llano de Guaje, shrub 1–2 ft. tall, *Johnston & Muller* 769; canyon at San Antonio de los Alamos, crevices of basalt and at base of tuff cliffs, 1–4 ft. tall, *Johnston* 8269, *Johnston & Muller* 931; 14 km. southeast of Rancho Alegre on road south to Valle Acatita, gypsum slopes, *Stewart* 2682; Rancho Las Uvas, shales on slopes, 5 dm. tall, *Stewart* 2716; San Lorenzo de la Laguna, 1880, *Palmer* 1119; Viesca, Feb. 1905, *Purpus* 1054. CHIHUAHUA: Presidio del Norte [Ojinaga], *Bigelow, Parry* (ISOTYPES).

Known only from our area and adjacent Texas; ranging north in Texas to the Chinati Mts., Presidio Co., and central Brewster Co. A shrub 1–3 ft. tall with slender usually rather strict branches, growing in dry well-drained places on hillsides and on and about cliffs and banks. Though centering in a calcareous region, it shows no marked soil preferences. I have found it on basalt, volcanic tuff, igneous intrusives, limestones, caliche, and gypsum. It is rarely common. It fruits freely but most of the fruit appears to develop from cleistogamic flowers. The species usually has narrow lanceolate or linear-lanceolate leaves. There are, however, three

collections from eastern Coahuila (*Gregg 535, Johnston 7159, and Shreve & Tinkham 9900*) which have oblong or oblong-elliptic, perhaps thinner, leaf-blades that are folded and have crisped-undulate margins.

Selinocarpus parvifolius (Torr.) Standl. Contr. U. S. Nat. Herb. 12: 388 (1909).

Selinocarpus diffusus var. *parvifolius* Torr. Bot. Mex. Bound. 168 (1859).

CHIHUAHUA: 10 mi. south of Ojinaga, base of low hills on outwash from gypseous and saline clays and shales, globose bush 1-2 ft. tall, *Johnston & Muller 12, 1446*; Presidio del Norte [Ojinaga], August, *Bigelow*.

Known only from the valley of the Rio Grande in Presidio and Brewster Counties, Texas, and in adjoining Chihuahua. The type was collected by Parry in "Cañons of the Rio Grande," presumably those between Ojinaga and the Big Bend. The species is probably a gypsophile and appears to be confined to areas of Upper Cretaceous shales and clays.

Selinocarpus Palmeri Hemsl. Biol. Centr. Am. Bot. 3: 6. t. 70 (1882).

COAHUILA: San Lorenzo de la Laguna, flowers bright pink with whitish base, May 1880, *Palmer 1118* (ISOTYPE).

Known only from the type collection. Nothing is recorded regarding the growth habit of this plant. The specimens suggest that it is a bush as large as or even larger than its relative, *S. Purpusianus*, but much more loosely branched. Like its relative it is probably a gypsophile.

Selinocarpus Purpusianus Heimerl, Oesterr. Bot. Zeits. 63: 353 (1913).

COAHUILA: Near Mohovano on road 16 mi. south of Laguna del Rey, confined to gypsum flat, frequent, rounded gray intricate bush 1-3 ft. tall, fl. yellowish, *Johnston 7807*; Laguna del Rey, fl. yellow, *Stewart 2652*; Sierra del Rey, June 1910, *Purpus 4505* (ISOTYPE); valley between La Vibora and Matrimonio Viejo, confined to gypsum-beds, frequent bush 1-3 ft. tall, *Johnston 9337*.

This gypsophilous species is known only from the collections cited. It is a grayish bush 1-3 ft. tall with gnarled woody branches and abundant dichotomous intricately interlocked twigs. The perianth has a bright yellow limb.

Selinocarpus Marshii sp. nov.

Frutex lignosus intricata et dichotome ramosissimus; ramulis foliatis simplice vel sparse et dichotome ramosis 2-4 cm. longis pilis minutis abundantis cinereis retrorsis obtectis; ramulis vetustioribus glabrescentibus sub lente multistriatis; foliis oppositis 9-13 mm. longis ca. 2 mm. latis, lanceolatis vel oblanceolatis, costatis sed enervatis, carnosulis bifacialibus viridibus, pilis pallidis retrorsis et pilis inconspicuis glanduliferis vestitis, basi gradatim attenuatis, apice acutis; floribus in axillis foliorum solitariis; pedicellis 0.5-2 mm. longis paullo infra apicem bracteis duobus ad 2 mm. longis oppositis lanceolatis inconspicuis gestis; perianthio 3-4 cm. longo elongate infundibuliformi extus cinereo pilis minutis pallidis reflexis vestito, parte ovariali ad 5 mm. longo 5-angulato, deinde sursum in tubo ca. 1 mm. crasso et 2 cm. longo transmutato, apice tubi (in alabastro) sursum in fauces 0.5-0.7 mm. longas et ca. 3 mm. diametro et lobos ca. 0.8 mm. longos ampliatus; anthocarpio 4-alato, corpore 9 mm. longo quadrangulato, faciebus ad 2 mm. latis bisulcatis sparse et retrorse strigulosis, alis ad 4 mm. latis.

COAHUILA: Hermanas, April 20, 1937, *Marsh 1579* (TYPE, Gray Herb.).

A close relative of *S. Purpusianus*, from which it differs in having the

branchlets, leaves, and perianth clothed in a gray indument of abundant minute appressed flattened white hairs, its leaf-bearing branchlets only very obscurely sulcate, and its perianth without glandular hairs. The type collection lacks data on habit and habitat and has flowers in mature bud but lacks perianths at anthesis. The species, however, probably agrees with *S. Purpusianus* in habit of growth, soil preference, and in the size and shape of perianth. That latter species, however, differs from *S. Marshii* in having the leaf-bearing branchlets very strongly sulcate and roughened with stipitate glands and some scattered stiffish erect hairs. Its green, evidently more succulent leaves are also roughened with stipitate glands. The two species differ strikingly in abundance and quality of indument.

Allionia incarnata L. Syst. ed. 10. 890 (1759).

Wedeliella incarnata (L.) Cockerell, Torreya 9: 167 (1909).

VERNACULAR NAMES: Yerba de la Hormiga; Yerba de la Mosca; Yerba del Hormigero.

COAHUILA: Allende, *Marsh* 2234; Cañon de Cienegas, Cuatro Cienegas, fl. red, *White* 1890; Monclova, *Marsh* 1825; desert near Rancho Santa Teresa, south of Castaños, *Wynd & Mueller* 189; between Hipólito and Sacramento, dry arroyos, *Wynd & Mueller* 72; 2 mi. west of Saltillo, road to Torreon, fl. reddish lavender, *White* 1666; Saltillo, waste places and bottom lands, prostrate, fl. damask-colored, 1898, *Palmer* 81; Saltillo, scarce, fl. purplish, July 16, 1848, *Gregg* 251; Sierra del Carmen, Sept. 2, 1936, *Marsh* 735, 867; 7 km. north of Agritos, east of Sierra del Pino, prostrate, dry flats, fl. orchid, *Stewart* 1276; 25 km. west of San Guillermo (northeast of Sierra del Pino), common on flats, fl. orchid, *Stewart* 1772; 6 km. east of El Tule, southern Sierra Hechiceros, sandy arroyo, fl. orchid, *Stewart* 486; 9 km. north of San Rafael, road to Castillon, hillsides, spreading, fl. lavender, *Stewart* 420; vicinity of Santa Elena, arroyos and hillsides, *Stewart* 258, 603; Tinaja Blanca, Sierra Cruces, creeping, arroyos and hillsides, abundant, fl. purple, *Stewart* 341; 5 mi. west of El Oro, road to Guimbaleté, *White* 1992; near Noria San Juan, southeast of Laguna del Rey, saline flats, fl. purplish, *Stewart* 3011; flats west of Las Uvas, Valle Acatita, prostrate, fl. purple, *Stewart* 2694, 2709; 13 km. south of Rancho Acatita, sandy plain, prostrate, fl. purplish, *Stewart* 2986; Cañon del Agua Grande, west of Las Delicias, dry slopes, fl. purple, *Stewart* 2793. CHIHUAHUA: Chihuahua, about mesas and arroyos, prostrate, fl. rose-colored, 1908, *Palmer* 194; Chihuahua, 1935, *LeSueur* 123; 25 mi. south of Chihuahua, 1936, *LeSueur*; 12 mi. south of Camargo, *White* 2191; northeast end of Sierra Diablo, rocky arroyo high in canyon, prostrate, fl. orchid, *Stewart* 993.

Southern California to trans-Pecos and southern Texas and south into Durango, Zacatecas, and middle-eastern Tamaulipas; also in western South America. A trailing herb which is widespread and frequently common in open places on silty flats and valley slopes and in rocky soils on hillsides and in arroyos. As is so common among the herbaceous members of the Nyctaginaceae, this plant is extremely variable in indument. This and other variations of the species have been discussed in detail by Heimerl, Repert. Sp. Nov. 31: 91-98 (1932). The fruit has firm usually incurved wing-margins which are either entire or coarsely and broadly toothed. Except for a few plants from the Big Bend and the lower Rio Grande Valley, which have more spreading and more deeply toothed margins on the fruit than common in *A. incarnata*, I have seen no plants whose fruit could be considered transitional between *A. incarnata* and *A. Choisyi*. Standley reports the species from hills about Tlahualilo, Durango (*Pittier* 486),

and Heimerl lists a collection from between Mapimi and Ojuelo, Durango (*Endlich 255*).

Allionia Choisyi Standl. Field Mus. Publ. Bot. 8: 310 (1931).

Allionia incarnata L. var. *glabra* Choisy in DC. Prodr. 13²: 435 (1849).

Wedeliella glabra (Choisy) Cockerell, Torreya 9: 167 (1909).

Allionia incarnata f. *multiserrata* Heimerl in Urban, Symb. Ant. 7: 212 (1912).

VERNACULAR NAME: Yerba de la Hormiga.

COAHUILA: Monclova, *Marsh 1655*; Perros Bravos, fl. purple, frequent, Sept. 20, 1848, *Gregg 466*. CHIHUAHUA: 25 km. northwest of Jaco, prostrate on silty flats, fl. orchid, fairly common, *Stewart 680*; 4 km. northeast of Santa Fe, common on flats, prostrate, fl. purplish, *Stewart 2596*. ZACATECAS: Cedros, garden, 1908, *Kirkwood 115*.

Eastern Arizona to trans-Pecos and southern Texas and south through Coahuila, Nuevo Leon, Tamaulipas, and San Luis Potosi into central and southern Mexico; also in the West Indies. Distinguished from *A. incarnata* by having the margin of the fruit pectinately lobed. Each margin is divided into 5-7 slender linear-subulate ascending or more commonly incurving lobes. In *A. incarnata* the margin is subentire or is coarsely and frequently irregularly dentate with 2-6 broadly triangular teeth. The forms of *A. Choisyi* found in the United States are usually glabrous and annual and have the medial crest on the outer face of the fruit bearing sessile or subsessile glands. In eastern Mexico the plants are mostly perennial, frequently hairy and glandular, and in central Mexico and the West Indies they may have the medial keels toothed or even with very slender appendages half to nearly as long as the lobes of the lateral margins. The type of *A. Choisyi* Standl. and *A. incarnata* var. *glabra* Choisy, upon which it is based, came from near Mexico City. In our area some plants are annual, others are perennial, and some are nearly glabrous and others show various amounts of viscid indument. The species appears to be almost as variable as *A. incarnata*.

Nyctaginia capitata Choisy in DC. Prodr. 13²: 429 (1849).

VERNACULAR NAMES: Immortal; (root) Yerba Blanca.

COAHUILA: Sierra del Carmen, Sept. 13, 1936, *Marsh 902*; Allende, 1939, *Marsh 1786*; Sabinas, 1902, *Nelson 6761*; 2 mi. northwest of Frontera, road to Natadores, silty desert plain, *Johnston 7175*; Cuatro Ciénegas, 1939, *Marsh 2019*; flats of La Vega, 15 mi. southeast of Cuatro Ciénegas, *Schroeder 176*; desert near Rancho Santa Teresa, south of Castaños, *Wynd & Mueller 179*; Saltillo, frequent, fl. bright red, July 16, 1848, *Gregg 264*; Saltillo, clay soil, plains and waste places, fl. vermilion, 1898, *Palmer 202*; Saltillo, 1930, *Fisher 30033*; Ciénega Grande, fl. scarlet, May 18, 1847, *Gregg*; Valle de los Guajes, 25 km. south of Rancho Buena Vista, grassy flat, *Stewart 1328*; 10 km. north of Agritos, silty flat, fl. red, *Stewart 1278*; 20 km. south of Castillon, along arroyo, fl. red, *Stewart 427*; 8 km. east of La Palma, valley north of Sierra Cruces, tobosa flat, fl. red, *Stewart 656*; 5 mi. northwest of Zenzontle, flat, corolla dark red, filaments magenta, *Johnston & Muller 973*; silty plain 2 mi. east of Bufido, oily and succulent, *Johnston & Muller 854*; valley west of Bufido, silty soil, *Johnston & Muller 845*; northwest end of Sierra Planchada, tobosa flat, fl. red, *Stewart 1012*; Jimulco, May 16, 1885, *Pringle*. CHIHUAHUA: Near Trinidad, flats, fl. red, *Stewart 2592, 2593*; 25 mi. south of Chihuahua, 1936, *LeSueur*; Ojo El Gallego, between Chihuahua and El Paso, 1846, *Wislizenus* (St. Louis). DURANGO: Mapimi, edge of cornfield, 1898, *Palmer 545*.

Trans-Pecos Texas and southeastern New Mexico to southern Texas and south into our area and adjacent Nuevo Leon. Reaching its southern limit

in central Durango. A plant with viscid-glandular rather succulent herbage and umbellate clusters of trumpet-shaped red or vermilion flowers, characteristic of clay valley soils and particularly of flats where water temporarily accumulates after storms. The stems are prostrate or trailing, commonly nearly a meter long, and arise from a coarse fleshy deeply descending root. Palmer reports that the dried root, because of its color called Yerba Blanca, is sold in the market at Saltillo and is said to be a popular remedy for stomach-ache. In some localities the plants appear to be prevalingly cleistogamic. Such plants have short stems, less than a decimeter in length, and some of them have only a basal rosette of leaves and the dense cluster of cleistogamic flowers borne at the level of the soil or even partially covered by it.

Acleisanthes longiflora Gray, Am. Jour. Sci. II. 15: 261 (1853).

Acleisanthes longiflora subsp. *hirtella* Standl. Contr. U. S. Nat. Herb. 12: 371 (1909).

Acleisanthes longiflora var. *hirtella* Standl. ex Heimerl, Notizbl. Bot. Gart. Berlin 11: 459 (1932).

VERNACULAR NAMES: Yerba Santa; Yerba de la rabia; Platiada; Trompetilla.

COAHUILA: Allende, 1939, *Marsh* 1802; Santa Anna Canyon, 1936, *Marsh* 536; Puerto San Lazaro, rocky slopes, *Wynd & Mueller* 158; Perros Bravos, fl. white, Sept. 20, 1848, *Gregg* 463 (isotype of var. *hirtella*); Saltillo, fl. white, night bloomer, 1898, *Palmer* 181; battlefield near Buena Vista, frequent, May 19, 1848, *Gregg* 88; Cañon Ybarra, Sierra del Pino, dry hillside, fl. white, *Stewart* 1847; Sierra del Pino, limestone ledges at mouth of south canyon, fl. white, opening at dusk, *Johnston & Muller* 729; valley northeast of Tanque Armendais, stony slope, *Johnston & Muller* 374; vicinity of Santa Elena, fl. white, *Stewart* 233, 244, 369, 1927; Cañon Tinaja Blanca, Sierra Cruces, hillside, fl. white, *Stewart* 589; Bolson de los Lipanes, between El Almagre and Cerros de Leja, silty plain, fl. white, *Johnston & Muller* 1250; La Botica, Valle Delicias, flats, fl. white, *Stewart* 2847; Parras, 1880, *Palmer* 1116; Jimulco, May 12, 1885, *Pringle* 122. CHIHUAHUA: Ojinaga, edge of field, *Shreve* 8103; Sierra San Carlos, road to mines, silty soil in canyon, *Johnston & Muller* 56; north of El Pino, about 10 km. southeast of Sierra Rica, rocky slope, fl. white, *Stewart* 2418; Cantarrecio, sands, Oct. 1852, *Thurber* 808; Aldama, prostrate, covering quite a space on mesquite bottoms, fl. white with a violet shading to tube, 1908, *Palmer* 243; rocky hills near Chihuahua, June 5, 1885, *Pringle* 101.

Central and southern Texas west into trans-Pecos Texas and southeastern New Mexico and south into northeastern Mexico; also in Arizona and southeastern California. A prostrate or very laxly decumbent plant of silty or rocky soils, frequently forming mats up to a meter in diameter. It appears to be confined to calcareous soils and is particularly common on loose rocky soils, such as talus, about the base of limestone mountains. The unusually slender and elongate white flowers, with tubes 10–15 cm. long and an abruptly spreading lobe about 15 mm. wide, stand erect from the prostrate herbage. The sight of a plant in full flower, with a score or more of these slender graceful elongate white trumpets arising from the gray carpet of the herbage, is a pleasure which can be enjoyed only for a brief period at dusk or for a few hours during an overcast morning, for the flowers usually open at dusk and close at or before sunrise. During the day the tubes of the closed flowers stand like quills or, withering, arch over or lie across the herbage. The plant has a very coarse fleshy taproot which becomes somewhat enlarged a decimeter or so below the surface of

the soil. Gregg reports that a decoction of the root was used for cholera, fevers, etc. The species commonly has foliage which is smooth and glabrous, or practically so. Rarely it is roughened by stiffish hairs. This minor form was described as subsp. *hirtella*. Heimerl has reported collections of it from the Sierra de la Paila (*Endlich* 844).

Acleisanthes crassifolia Gray, Am. Jour. Sci. II. 15: 260 (1853).

COAHUILA: Muzquiz, 1938, *Marsh* 1105.

Known otherwise only from Val Verde County, Texas; the type was collected near Del Rio. The cited collection has mature fruit developed from cleistogamic flowers.

Acleisanthes acutifolia Standl. Contr. U. S. Nat. Herb. 12: 370 (1909).

COAHUILA: Saltillo, base of stony ridge, fl. cream-colored, 1898, *Palmer* 282; Carneros Pass, fl. pale lilac, Sept. 9, 1889, *Pringle* 2843; Sierra del Pino, mouth of south canyon, gravelly bench at base of limestone slope, fl. white, *Johnston & Muller* 728; west base of Picacho del Fuste, rocky flats, prostrate, fl. white, *Johnston* 8416; near Aguaje Pajarito, west end of Sierra Fragua, decumbent, fl. white with yellowish ribs, *Johnston* 8791; south base of Picacho San José, sunny rocky terrace, fl. flesh-colored, *Johnston & Muller* 819; Carrizo, south base of Sierra Cruz, dry open hillside, fl. white, *Stewart* 2168; Rancho Parritas, east side Valle Acatita, gypsum mesa, fl. white, *Stewart* 2765; Sierra Parras, Oct. 1910, *Purpus* 4753. CHIHUAHUA: Sierra Santa Eulalia, Aug. 25, 1885, *Pringle* 671. ZACATECAS: Cardona, rocky hillside, decumbent, fl. whitish, *Johnston* 7376.

Ranging from our area north into trans-Pecos Texas (Brewster and Pecos Counties). A perennial, with numerous leafy prostrate or laxly ascending stems 1–2 dm. long. It appears to be confined to rocky limestone soil and is not common.

Acleisanthes nana sp. nov.

Planta parva perennis humilis grisea e radice palari crassa profunda oriens; caulibus pluribus decumbentibus vel ascendentibus foliosis 2–5 cm. longis gracilibus breviter ramosis pilis hispidulis et glanduliferis et pilis albidis appressis plus minusve ornatis; foliis oppositis crassiusculis inconspicue et sparse nervatis; foliis infimis mox deciduis modice majoribus obtusis plus minusve glabris conspicue petiolatis; foliis caulinis numerosis quam internodiis saepe duplo longioribus, setis subulatis rigidis erectis glanduliferis conspicue obsitis, pilis albidis appressis plus minusve ornatis, lamina lanceolata 8–14 mm. longa 3–7 mm. lata, infra medium latiore, deinde basim versus in petiolum 2–4 mm. longum contracta, apice acuta, margine plus minusve crispata; floribus in axillis foliorum subsessilibus; bracteis involucrialibus 3 lanceolatis 2–3 mm. longis quam anthocarpio duplo brevioribus; perianthio infundibuliformi 12–15 mm. longo extus hispidulo-puberulente, limbo ad 13 mm. diametro, staminibus 5 exsertis; anthocarpio 5–6 mm. longo 1–1.5 mm. crasso prismatico glandulari-puberulente, lateraliter sulcis duobus approximatis lineatis profundis basim versus ornato, sub apice abrupte contracto, apice supra costas principales glandulas magnas hemisphaericas gerente.

COAHUILA: Fraile, valley, July 10, 1941, *Stanford et al.* 291. SAN LUIS POTOSI: Los Charcos, May 15, 1891, *Pringle* 5081 (TYPE, Gray Herb.).

A very well-marked species related to *A. Wrightii* and *A. acutifolia*, from which it is readily distinguished by its dwarf habit, small glandular hispid

lanceolate leaves, small flowers, short involucre bracts, and small prismatic glandular-puberulent 10-ribbed anthocarp. The anthocarp is distinctive. It is slightly the thickest above the middle, several times longer than broad, and prismatic in general form. Down each side there is a pair of parallel grooves which obviously deepen and broaden towards the base and apex. These grooves evidently delimit five lateral ribs which have been crowded and narrowed by the lateral outgrowth and expansion of the five broad principal ribs forming the angles of the fruit. This condition is different from that in *A. Wrightii* and *A. acutifolia*, in which the lateral ribs are not evident, being apparently completely covered by the overgrowth of the principal ribs. At the summit of the fruit in *A. nana* the principal ribs are replaced by five hemispherical glands which do not protrude above the level of the ribs.

The species is known only from Fraile and Charcos. No information is available as to the exact habitat selected by the plant. However, judging from the behavior of other rare plants known from these two general localities, I suspect that *A. nana* may be gypsophilous.

Boerhavia linearifolia Gray, Am. Jour. Sci. II. 15: 322 (1853).

Boerhavia linearifolia var. *glabrata* Gray, Am. Jour. Sci. II. 15: 322 (1853).

Boerhavia tenuifolia Gray ex Coult. Contr. U. S. Nat. Herb. 2: 355 (1894).

Boerhavia linearifolia subsp. *glandulosa* Standl. Contr. U. S. Nat. Herb. 12: 387 (1909).

Boerhavia Lindheimeri Standl. No. Am. Fl. 21: 208 (1918).

COAHUILA: Rancho Agua Dulce, lower slopes of Sierra San Manuel, Wynd & Mueller 356; Puerto Santa Anna, July 21, 1936, Marsh 941; mountains 24 mi. northeast of Monclova, 1880, Palmer 1122; Sierra de la Paila, Oct. 1910, Purpus 4958; Saltillo, stony hill-slope under bushes, fl. damask-color, 1898, Palmer 155; Saltillo, highlands, scarce, fl. purple, June 2, 1848, Gregg 110; Buena Vista, south of Saltillo, frequent, fl. purplish red, July 24, 1848, Gregg 281; Carneros area, 1880, Palmer 1121; slopes of Sierra del Carmen 10 km. northeast of Hac. Encantada, arroyo banks, fairly common, Stewart 1563; Mesa Grande, 40 km. northwest of Hac. Encantada, open hillside, fairly common, fl. purple, Stewart 1610; base of Sierra Guajes 7 km. east of Rancho Buena Vista, limestone hillside, fairly common, fl. orchid, Stewart 1478; high mesa 12 km. northwest of Rancho Buena Vista, hillside, fl. purple, Stewart 1431; 20 km. northwest of Puerto del Aire, grassy hills, fl. purple, Stewart 1284; Sierra del Pino, ridge west of La Noria, on ledges, prostrate, fl. magenta, Johnston & Muller 620; Sierra Madera, Cañon Pajarito, dry rocky arroyo, fl. lavender, Muller 3151; Sierra Madera, Cañon Charretera, rocky open flats, stems spreading, fl. pink, Johnston 9138; near Santa Elena, eastern foothills of Sierra Cruces, along arroyos and on limestone slopes, prostrate or ascending, Stewart 262, Johnston & Muller 212; Cañon Tinaja Blanca, Sierra Cruces, dry open hillsides, fl. purple, Stewart 593; La Botica, Valle Delicias, in arroyos, ascending, fl. purple, Stewart 2884. CHIHUAHUA: Sierra San Carlos, road to mines, rocky ridge crest, Johnston & Muller 66; 1 km. southeast of Rancho Madera, southeast base of Sierra Rica, dry arroyo, ascending, fl. purple, Stewart 2442; south end of Sierra Seca, 5 km. south of San José del Progreso, dry rocky slope, frequent, ascending, fl. purple, Stewart 2306.

Central and trans-Pecos Texas and adjoining New Mexico south into our area. A plant of hillsides and stabilized alluvial terraces in limestone areas. It has a strong deep woody tap-root and usually very numerous prostrate or ascending slender wiry stems 1-2 dm. long. Its narrowly to broadly lanceolate, frequently revolute-margined leaves, usually 2-3 cm. long,

readily distinguish this species. As with other congeners it is variable in indument, being smooth and glabrous or minutely glandular and more or less hispidulous or even shaggy-hispid on the stems. Plants varying widely in indument and in leaf-size and -shape may usually be found in any locality. The type of the species, the only specimen upon which Gray wrote "*Boerhaavia linearifolia* n. sp.," is that part of *Wright 608* which was collected on a "high rocky limestone prairie" between Turkey and Elm creeks, in eastern Kinney Co., Texas. It is a form with the leaves hispid and the stems glandular and shaggy-hispid. The type of var. *glabrata*, also part of *Wright 608*, was collected in the "pebbly bed of a small creek beyond Zacate Creek," i.e. in eastern Val Verde Co., Texas. It consists of two branches, one completely glabrous and smooth, the other with scattered minute glands and (towards the base) sparsely minute-hispidulous.

Boerhavia anisophylla Torr. Bot. Mex. Bound. 171 (1859).

Boerhavia Palmeri Wats. Proc. Am. Acad. 18: 142 (1883).

Boerhavia anisophylla f. *polytricha* Heimerl, Repert. Sp. Nov. 12: 220 (1913).

VERNACULAR NAME: Yerba de la mosca.

COAHUILA: Hills near Mesillas, frequent, 1–2 ft., fl. purple, Sept. 23, 1848, *Gregg 533*; Saltillo, 1880, *Palmer 1120* (type of *B. Palmeri*); Saltillo, base of stony hills and in ravines, fl. crimson-purple, 1898, *Palmer 156*; 2 mi. west of Saltillo, road to Torreon, fl. pinkish, *White 1683*; southern foothills of Sierra Hechiceros, 6 km. east of El Tule, fairly common on hillsides, fl. orchid, *Stewart 467*; 9 mi. south of El Tule, south base of Sierra Hechiceros, exposed gravelly ridge, stems erect or ascending, fl. purple, *Johnston & Muller 1373*; Tanque Jerico, with *Hechtia* on limestone hillside, *Johnston 8336*; Cerro de Cypriano, crevices of rocks, June 1910, *Purpus 4544*. CHIHUAHUA: Chihuahua, 1935, *LeSueur 37*; Sierra Santa Eulalia, limestone hills, Aug. 12, 1885, *Tringle 685*; Los Reyes, about 8 mi. south of Jimenez, fl. reddish purple, *White 2114*. DURANGO: Yerbánis, *Shreve 9135*.

Brewster County, Texas, south in Chihuahua, Coahuila, and Tamaulipas to San Luis Potosí and Durango. Apparently confined to calcareous rocks. A perennial with a thick woody tap-root. The stems are few, rather coarse and stiff and sparsely branched. The plant is decumbent and leafy below the middle and above erect and strongly ascending. The type was collected at the "Entrance of the Grand Cañon of the Rio Grande" and is an unusual form with the stems and leaves practically glabrous. Most collections of the species have the stems, and frequently the leaves, densely and minutely glandular, and commonly also hispidulous. Coarse hairs, in varying abundance, are frequently present on the basal stem-internodes. The forma *polytricha*, representing the common form in our area, is based upon *Endlich 175b* from near Yerbánis, Durango.

Boerhavia gracillima Heimerl, Bot. Jahrb. 11: 86 (1889).

Boerhavia anisophylla var. *paniculata* Coult. Contr. U. S. Nat. Herb. 2: 356 (1894).

Boerhavia organensis Standl. Contr. U. S. Nat. Herb. 12: 385 (1909).

Boerhavia gracillima subsp. *decalvata* Standl. Contr. U. S. Nat. Herb. 12: 386 (1909).

COAHUILA: Sierra del Carmen, Aug. 22, 1936, *Marsh 577*; Santa Anna Canyon, 1936, *Marsh 552*; Puerto San Lazaro, rocky slopes, *Wynd & Mueller 125*; Picacho Noche Buena, basalt ledges, prostrate, widely spreading, fl. red, *Johnston & Muller 178*; Cañon Indio Felipe, Sierra Hechiceros, cliffs, fl. purple, *Stewart 148*; Cañon Tinaja Blanca, Sierra Cruces, bed of sandy arroyo, prostrate, fl. red, *Stewart 627*; 8 km. northeast of Santa Elena, dry limestone hillside, prostrate, fl. red, *Stewart 1123*; near

San José, southeast of Sierra Cruces, about cliffs of limy conglomerate, prostrate, stems becoming 12 dm. long, fl. reddish, *Johnston & Muller* 999. CHIHUAHUA: Sierra San Carlos, road to mine, canyon-bottom, prostrate, fl. red, *Johnston & Muller* 51; Cañon Madera, Sierra Rica, dry rocky arroyo, fl. reddish, *Stewart* 2526; 10 km. north of Escobillas, open rocky slope, prostrate, fl. reddish, *Stewart* 2378; 3 mi. south of Pirámide, gravelly terrace along arroyo, prostrate, *Johnston* 8109; hills southeast of Chihuahua, Aug. 15, 1885, *Pringle* 665; Chihuahua, in arroyos, fl. maroon, 1908, *Palmer* 199.

Trans-Pecos Texas (Brewster Co. west) to Arizona and south to southern Mexico. A perennial with a strong woody deep tap-root. The stems become 10–15 dm. long. A plant may cover an area a meter or more in diameter, its repeatedly branched slender branches and branchlets bearing myriads of small wine-colored flowers. The species appears to be widely distributed but is only locally common, and then seemingly in disturbed rocky soils. Because of its lack of glandularity and the very elongate slender pedicels, the plant seems cleaner and more openly branched than usual in this genus.

Boerhavia coccinea Mill. Gard. Dict. ed. 8. no. 4 (1768).

Boerhavia hirsuta Jacq. Hort. Bot. Vind. 1: 3. t. 7 (1770); L. Mant. 2: 170 (1771); Willd. Phytogr. 1: 1 (1794), Sp. Pl. 1: 20 (1797).

Boerhavia caribaea Jacq. Obs. Bot. 4: 5. t. 84 (1771).

Boerhavia polymorpha Rich. Act. Soc. Hist. Nat. Paris 1: 185 (1792); Heimerl, Ann. Cons. et Jard. Bot. Genève 5: 188 (1901).

Boerhavia viscosa Lag. & Rodr. Anal. Cienc. Nat. Hist. 4: 256 (1801).

Boerhavia ramulosa Jones, Contr. W. Bot. 10: 40 (1902).

Boerhavia ixodes Standl. Contr. U. S. Nat. Herb. 13: 423 (1911).

COAHUILA: Monclova, 1939, *Marsh* 1727; San Antonio de los Alamos, shaded gravelly canyon-floor, stems widely spreading, *Johnston & Muller* 882; Cañon Tinaja Blanca, Sierra Cruces, banks of arroyo, not common, fl. dark red, *Stewart* 1136; north end of Bolson de los Lipanes, between El Almagre and Cerros de Leja, margin of mogote on plain, prostrate-spreading, *Johnston & Muller* 1254; Rancho La Botica, Valle Delicias, common in arroyos, prostrate, fl. purplish, *Stewart* 2881; Horizonte, 1937, *Wynd* 775; Torreon, ditch-bank, very widely spreading, fl. crimson, 1898, *Palmer* 487. CHIHUAHUA: Rancho El Pino, 10 km. southeast of Sierra Rica, rocky slope, fl. reddish, *Stewart* 2387; 8 km. south of Rancho Encinillas, sandy flat, prostrate, fl. red, *Stewart* 711; 7 mi. east of Victoria, sprawling in bushes on arroyo-bank, *Stewart & Johnston* 2001; Chihuahua, stony arroyos, not common, fl. crimson, 1908, *Palmer* 193; Presa de Chihuahua, 1936, *LeSueur* 617; valley near San Pablo, fl. red, April 29, 1847, *Gregg*; 3 mi. north of San Lucas on road to Chihuahua, fl. red, *White* 2319; 3 mi. west of Camargo, fl. dark red, *White* 2273. ZACATECAS: Concepcion del Oro, widely spreading, fl. maroon, 1904, *Palmer* 290.

Florida to southeastern California and south in the warmer parts of America. For the present plant Standley, No. Am. Fl. 21: 206 (1918), took up and gave currency to the name *B. caribaea* Jacq. (1771). Unfortunately, however, that name undoubtedly has earlier valid synonyms in *B. coccinea* Miller (1768) and *B. hirsuta* Jacq. (1770). If our American plant is to be distinguished from the Old World *B. diffusa* L. it must be called *B. coccinea* Miller. By some mischance Standley applied Miller's name to another tropical species which previously had been generally known as *B. paniculata* Rich. (1792). The name "*B. paniculata*" of L. C. Richard, however, is antedated by *B. paniculata* Lam. (1791) and the

tropical species known as "*B. paniculata*" appears to have its earliest name in *B. adscendens* Willd. (1797), cf. Heimerl, Bot. Jahrb. 21: 619 (1896).

This is a perennial species with elongate prostrate or widely spreading stems. Like most members of the group it is variable as to indument, being glandular throughout or only towards the base, and having the stems with or without conspicuous elongate hairs. Its dense umbellate clusters of glandular fruits readily distinguish the species from *B. gracillima*.

Boerhavia erecta L. Sp. Pl. 3 (1753).

COAHUILA: 2 km. west of Santa Elena, foothills of the Sierra Cruces, flats, not common, erect, 5–10 dm. tall, fl. light pink, *Stewart* 837; Bolson de los Lipanes, between El Almagre and Cerros de Leja, margin of mogote on plain, erect with ascending branches, *Johnston & Muller* 1255. CHIHUAHUA: Pass 10 mi. south of Mula, alluvial terrace, erect, *Johnston* 8046; 13 mi. west of Chihuahua, road to Santa Isabel, fl. pink, *White* 2459; 8 mi. north of San Lucas, road to Chihuahua, fl. white, *White* 2322; 12 mi. south of Camargo, fl. pinkish, *White* 2205; 31 mi. southeast of Jimenez, abundant on grassy slopes, fl. pink, *Muller* 3328; Cañon del Coyote, southern end of Sierra Diablo, frequent in dry arroyos, fl. white, *Stewart* 2615.

Widely distributed in the warmer parts of America, extending north to southern Arizona and New Mexico and along the coastal plain through eastern Texas and Florida north to South Carolina. An upright annual herb becoming 5–10 dm. tall. The plant has one or a very few erect or nearly erect stems which are ascendingly branched above. Standley, Contr. U. S. Nat. Herb. 13: 427 (1911), cites a collection (*Pittier* 487) from "barren hills about Tlahualilo," Durango.

Boerhavia intermedia Jones, Contr. W. Bot. 10: 41. t. 16 (1902).

Boerhavia universitatis Standl. Contr. U. S. Nat. Herb. 12: 380 (1909).

Boerhavia erecta var. *intermedia* Kearney & Peebles, Jour. Wash. Acad. 29: 475 (1939).

COAHUILA: 12 mi. north of Monclova, silty valley soil in mesquite thicket, *Johnston* 7189; Monclova, 1880, *Palmer* 1123; 2 km. west of Santa Elena, foothills of the Sierra Cruces, flats, *Stewart* 837A; Zenzontle, stony sunny slope, prostrate, *Johnston & Muller* 965; 2–3 mi. north of San Antonio de los Alamos, gravelly plain, plant spreading, *Johnston* 8231; San Antonio de los Alamos, dry gravelly slope below tuff cliffs, stems ascending, *Johnston & Muller* 888; Cañon del Agua Chica, west of Las Delicias, common on flats, stems ascending, fl. white, *Stewart* 2832; Torreon, in shade of mesquites on plain, 1898, *Palmer* 468. CHIHUAHUA: Pass 10 mi. south of Mula, alluvial terrace, diffuse, *Johnston* 8045; low ridge a mile southwest of Mesteñas, rocky slope, not common, prostrate, *Stewart & Johnston* 2025; Meoqui, 1936–37, *LeSueur*; 8 mi. north of San Lucas, road to Chihuahua, fl. pink, *White* 2320; 15 mi. west of Las Delicias, road to San Lucas, fl. pink, *White* 2296. DURANGO: Cerro de San Ignacio, July 1910, *Purpus* 4619.

Trans-Pecos Texas to southeastern California and south into northern Mexico. Reaching its southern limit in our area. The species is probably most closely related to *B. erecta*, but differs in size, habit, inflorescence, and distribution. It has been collected growing near *B. erecta* but is known only from areas in the northwest portions of the range of that species, and in trans-Pecos Texas and adjoining New Mexico it is a frequently collected plant in an area from which *B. erecta* is unknown. The plants of *B. intermedia* are seldom 5 dm. tall and are usually lower and much branched near the base, with the elongate branches loosely ascending. Young plants are

erect; old ones tend to become decumbent. The fruits are borne on subequal pedicels forming tidy long-peduncled umbels, readily distinguished from the looser imperfectly umbellate inflorescences of *B. erecta*. The inflorescence of *B. erecta* is a cymose panicle in which many of the branchlets become more or less crowded and bear their fruits in a subumbellate arrangement. Associated with the subumbellate clusters in the inflorescence of *B. erecta* are branched, irregular, and more open groupings of fruit that are evidently cymose. Even the subumbellate clusters have the fruits borne on pedicels of unequal length that are produced at different levels below the apex of the common axis. Furthermore, in these subumbellate clusters 2 or 3 fruits may be borne on a single "pedicel." The compact neat umbels of *B. intermedia* are stable units in a fixed type of inflorescence and readily serve to distinguish that species from *B. erecta*.

Boerhavia spicata Choisy in DC. Prodr. 13²: 456 (1849).

Boerhavia spicata var. *Torreyana* Wats. Proc. Am. Acad. 24: 70 (1889).

Boerhavia Torreyana (Wats.) Standl. Contr. U. S. Nat. Herb. 12: 385 (1909).

Boerhavia Coulteri (Hook.) Wats. Proc. Am. Acad. 24: 70 (1889).

Boerhavia Rosei Standl. Contr. U. S. Nat. Herb. 13: 424 (1911).

Boerhavia Watsoni Standl. Contr. U. S. Nat. Herb. 12: 384 (1909).

COAHUILA: Red dunes at Tanque Colorado, stems ascending, *Johnston* 8657; Torreon, sandy places along Rio Nazas, 1898, *Palmer* 488. CHIHUAHUA: 10 km. south of Escobillas, frequent on sandy slope, stems ascending, fl. purple, *Stewart* 2355; Chihuahua, 1935, *LeSueur* 388.

Central Texas to southeastern California and south into our area and along the Pacific Coast to Sinaloa. An annual growing in sandy places. A species readily recognized by its racemose fruiting inflorescences, its minute corollas, and the inconspicuous bracts subtending the fruit.

Boerhavia Wrightii Gray, Am. Jour. Sci. II. 15: 322 (1853).

Boerhavia bracteosa Wats. Proc. Am. Acad. 20: 370 (1885).

COAHUILA: Las Margaritas, west side of Valle Delicias, frequent in sandy arroyo, ascending, *Stewart* 2947. CHIHUAHUA: 5 mi. southeast of San Carlos, gravelly bank of small arroyo, erect, corolla white, pink outside towards the base, *Johnston & Muller* 80; 8 mi. north of San Lucas, road to Chihuahua, fl. white, *White* 2323; 3 mi. north of Charca Piedra (21 mi. northeast of Camargo), erect, under bushes on silty plain, *Johnston* 7930.

Trans-Pecos Texas to southeastern California and adjoining northern Mexico, reaching its southern limit in our area. An annual herb, readily recognized by its prevailing 4-angulate fruits and the conspicuous bracts on the elongating racemose inflorescence.

Boerhavia purpurascens Gray, Am. Jour. Sci. II. 15: 321 (1853).

Reported from "Near Chihuahua, 1887, *Palmer* 1582" by Standley, Contr. U. S. Nat. Herb. 13: 425 (1911). Otherwise known only from Arizona and western New Mexico. A well-marked species related to *B. Wrightii*, from which it is distinguished by its usually 5-angulate fruits and non-elongating dense glomerate clusters of flowers and fruit, which are interspersed with evident persistent glandular-villous bracts.

Cyphomeris crassifolia Standl. Contr. U. S. Nat. Herb. 13: 428 (1911).

COAHUILA: 2 mi. northwest of Frontera, road to Natadores, silty desert plain,

6–12 inches tall, *Johnston* 7178; Saltillo, one plant, near river, 2 ft. tall, 1898, *Palmer* 172 (ISOTYPE).

Known only from eastern Coahuila and Nuevo Leon. Very closely related to *C. gypsophiloides* but apparently distinguishable by its triangular-ovate sinuate or sinuately lobed leaf-blades and densely puberulent stems and leaves.

Cyphomeris gypsophiloides (M. & G.) Standl. Contr. U. S. Nat. Herb. 13: 428 (1911).

VERNACULAR NAME: Pega mosca.

COAHUILA: Sierra del Carmen, Aug. 22, 1936, *Marsh* 578; La Azufrosa, 3 ft. tall, abundant, Sept. 22, 1848, *Gregg* 513; Saltillo, three plants under bushes on shady embankment, stems sticky, 1898, *Palmer* 171; Rancho El Pino, northwest of Sierra del Pino, in mogote, *Stewart* 1783; Cañon Ybarra, Sierra del Pino, arroyo bank, *Stewart* 1894; La Noria, Sierra del Pino, sprawling, shaly arroyo-bank, *Johnston & Muller* 508; Sierra del Pino, mouth of southern Canyon, hillside, *Stewart* 1192; San Antonio de los Alamos, gravelly shaded canyon floor, *Johnston & Muller* 884; Sierra Hechiceros, Cañon Indio Felipe, *Stewart* 50, 67, *Johnston & Muller* 1333; Sierra Almagre, rocky places in deep shaded canyon, *Johnston & Muller* 1185; Sierra Mojada, Cañon Hidalgo, hillside below crest, *Stewart* 1086; La Botica, Valle Delicias, *Stewart* 2854, 2944; Sierra Parras, Oct. 1910, *Purpus* 4956, 4957; San Lorenzo de la Laguna, 1880, *Palmer* 1125. CHIHUAHUA: Sierra Rica, Cañon Madera, dry arroyo bank, *Stewart* 2443; Santa Eulalia Hills, 1885, *Wilkinson*; rocky hills near Chihuahua, limestone ledges, Aug. 1885, *Pringle* 693.

Southeastern New Mexico, trans-Pecos, central, and southern Texas, and south in Chihuahua, Coahuila, Tamaulipas, and Hidalgo to Oaxaca. A perennial with slender brittle stems that are sprawling, ascending, or erect. It is rarely common. Usually growing in rocky soil and frequently scrambling in low bushes. The perianth is purplish, magenta, pink, and, not uncommonly, even white. The foliage varies from lance-linear to lanceolate and from completely glabrous and lustrous to somewhat puberulent and even sparsely glandular, especially when young. The type was collected in Tehuacan, Puebla. The specific name is inappropriate.

Cyphomeris gypsophiloides var. *Stewartii* var. nov.

A varietate typica differt caulibus et foliis glandulosis, pilis minutis glanduliferis abundanter obsitis.

CHIHUAHUA: Sierra Diablo, 3 km. east of Cañon Rayo, open hillside, not common, 1 m. tall, fl. white, *Stewart* 941; Sierra Diablo, mouth of Cañon Rayo, arroyo bank, not common, 12 dm. tall, fl. violet, *Stewart* 941; large canyon near northeast end of Sierra Diablo, 1 m. tall, July 29, 1941, *Stewart* 1943 (TYPE, Gray Herb.); Cañon Coyote, south end of Sierra Diablo, 20 km. northwest of Santa Fe, dry arroyo, ascending, fl. purple, *Stewart* 2612.

This robust very glandular variety is known only from the Sierra Diablo in extreme southeastern Chihuahua. It may deserve specific rank. However, some plants of *C. gypsophiloides* from southwestern Coahuila appear to be transitional to the variety, having a robust habit and scattered glands on the foliage.

Commicarpus scandens (L.) Standl. Contr. U. S. Nat. Herb. 12: 373 (1909).

Boerhavia scandens L. Sp. Pl. 3 (1753).

COAHUILA: Sierra Hechiceros, Cañon Indio Felipe, along creek banks, *Stewart* 25, 108; San Antonio de los Alamos, sprawling among rocks at base of cliffs, *Johnston &*

Muller 881; Cañon del Agua Grande, Sierra Sobaco west of Las Delicias, on gypsum near water, 1 m. tall, *Stewart 2811*. CHIHUAHUA: Sierra Organos, 1937, *LeSueur 1396*; Aldama, shady woods along water ditch, scarce, stems long, fl. greenish yellow, 1908, *Palmer 241*.

From trans-Pecos Texas (Presidio County, in canyons along the Rio Grande) and southern Arizona south through Mexico; West Indies; north-western South America. In Mexico best known from the western and southern parts of the country. Standley reports that it behaves as an introduced ruderal weed on the west coast of Mexico. In our area, however, the plant is seemingly native, rare, and not at all aggressive.

Anulocaulis eriosolenus (Gray) Standl. Contr. U. S. Nat. Herb. 12: 375 (1909).

Boerhavia eriosolena Gray, Am. Jour. Sci. II. 15: 322 (1853).

VERNACULAR NAMES: Pegajosa; "Pea monte."

COAHUILA: 4 mi. west of Cuatro Ciénegas, stony slope, fl. pink, *Johnston 7155*; near Azufrosa, 3 ft. tall, fl. pale red, Sept. 22, 1848, *Gregg 512* (TYPE); 55 mi. west of Saltillo (23 mi. east of Paila), about rocks on steep sandstone slope, *Johnston 7701*; 14 mi. east of Paila, *Shreve & Tinkham 9894*; south end of Cañada Oscuro near Tanque La Luz, confined to gypsum beds on escarpment, 1-4 ft. tall, fl. purple, not common, *Johnston 8493*; ascent to Sierra Fragua east of Tanque Colorado, local on banks of cemented gravel, fl. red, 3-6 ft., *Johnston 8810*; valley between La Vibora and Matrimonio Viejo, confined to gypsum beds, 1-4 ft. tall, frequent, fl. pink, *Johnston 9344*; 2 km. southeast of Noria San Juan (southeast of Laguna del Rey), plains, common, fl. purple, *Stewart 2658*; 16 mi. south of Laguna del Rey, gypsum plains, 1-4 ft., *Johnston 7813*; Rancho Las Uvas, gypsum slopes on east side of Valle Acatita, scarce, fl. purple, *Stewart 2727*; San Lorenzo de la Laguna, 1880, *Palmer 1124*; Viesca, March 1905, *Purpus 1053*.

Known to me only from Coahuila and Brewster County, Texas. Standley, Contr. U. S. Nat. Herb. 13: 430 (1911), reports a collection from Torreon made by Purpus in 1903. Torrey, Bot. Mex. Bound. 172 (1859), reports collections from "gravelly plains near Presidio del Norte [Ojinaga], and below the Great Cañon of the Rio Grande." The latter station may be the canyons in the Big Bend. The report from Ojinaga I have been unable to verify. The only member of the genus I have seen from about Ojinaga is *A. reflexus*.

The species appears to be a gypsophile and confined to pure gypsum or mixed gypseous soils. It is very distinct, differing from its congeners in the conspicuously villous tube of its pink perianth and in the calyx-like involucre of 4-6 tardily deciduous subscarious bracts which subtends each flower. The root is apparently biennial and never forms a gnarled and woody caudex. The fruit is turbinate with the summit broadly obtuse or retuse. The glutinous bands at the middle of the stem-internodes are conspicuously developed. The stems and leaves are usually flushed with pink or rose.

Anulocaulis leiosolenus (Torr.) Standl. Contr. U. S. Nat. Herb. 12: 375 (1909).

Boerhavia leiosolena Torr. Bot. Mex. Bound. 172 (1859).

TEXAS (Hudspeth Co.): Gypsum quarry east of Finlay, weathered gypsum, *Waterfall 5026*; Great Canyon of the Rio Grande, *Bigelow*.

The type of this species was collected "In gypseous soil, Great Cañon of the Rio Grande, 70 miles below El Paso, June; Parry," or, in other

words, at the canyon of the Rio Grande a mile or so below Indian Hot Springs in southern Hudspeth Co., Texas. The species is naturally to be expected in adjoining portions of Chihuahua.

Anulocaulis leiosolenus var. *lasianthus* var. nov.

A varietate typica differt perianthiis praesertim in alabastro extus distincte puberulentibus vel villosulis, haud glabris.

TEXAS (Brewster Co.): Hot Springs, 1937, *Warnock 701A*; $5\frac{1}{4}$ mi. east of Terlingua, Sept. 24, 1938, *Cory 30251* (TYPE, Gray Herb.).

Known only from the Big Bend, but occurring near the Rio Grande at Hot Springs and consequently to be expected in adjoining Coahuila. Apparently an isolated eastern race of *A. leiosolenus* distinguishable only by its hairy perianths. It is separated from typical *A. leiosolenus* by the whole of Presidio County, Texas, an area in which the genus is represented only by *A. reflexus*. As with the species, the variety is probably also gypsophilous.

Anulocaulis reflexus sp. nov.

Planta perennis erecta 3–10 dm. alta e caudice lignoso erecto erumpens; caulibus pluribus glaberrimis pallidis rigide ascenderetque ramosis nullo modo glutinosis; foliis e partibus inferioribus caulis et ramorum infimorum in jugis 2–4 et 5–15 cm. longe distantibus gestis, oppositis coriaceis in sicco rigidis et fragilibus; lamina cordata vel cordato-reniformi 4.5–9 cm. lata 4–11 cm. longa, apice acuta vel obtusa vel rotunda, basi sinu 4–11 mm. profundo donata, margine plus minusve irregulariter sinuata obtuse denticulata brunnea glandulari-incrassata, pagina utraque plus minusve abundanter glanduloso-tuberculata (tuberculis brunneis praesertim eis paginae superioris laminae minute et sparse villosulis); floribus nodis inflorescentiae laxae dispositis haud congestis; perianthio rosaceo, tubo non raro plus minusve curvato ca. 1 cm. longo basim versus ca. 1 mm. crasso, deinde sursum gradatim ampliato apice ca. 2.5 mm. crasso, lobis 5 oblongis 5–10 mm. longis ca. 2.5 mm. latis deflexis; perianthiis post anthesi subtubulosis rectis 10–14 mm. longis persistentibus; staminibus inaequalibus 3 ca. 1 cm. longe exsertis; anthocarpio turbinato 6 mm. longo ad 4.5 mm. diametro, medio annulo incrassato anguste alato circumcincto, parte inferiore conico 5-costato, parte superiore majore conico-hemisphaerico 10-costato.

CHIHUAHUA: 10 mi. south of Ojinaga, silty soil along base of low hills, outwash from saline and gypsiferous clays and shales, frequent, erect, 1–3 ft. tall, Aug. 8, 1940, *Johnston & Muller 10* (TYPE, Gray Herb.); 10 mi. south of Ojinaga, base of low hills in gypseous saline soil, fl. pink, Aug. 9, 1941, *Johnston 8023*; 3 mi. north of Chapo, frequent along outcrops of shales, 1–3 ft. tall, fl. purple, Sept. 23, 1940, *Johnston & Muller 1440*. TEXAS: South end of Van Horn Mts., about 11 mi. southwest of Chispa, gypseous shale ridge, Jeff Davis Co., July 26, 1943, *Waterfall 5296*; Old Newman Spring, just east of San Carlos Creek one mile north of Weatherford's, shrubby at base, fl. fresh pink, filaments long-protruding and showy, Presidio Co., June 11, 1941, *Hinckley 1665*.

A well-marked species, probably most closely related to *A. leiosolenus*. Readily distinguished from all its congeners by having the limb and lobes of its perianth reflexed. In previously described species of this genus the limb of the perianth is funnel-form and its lobes are ascending. In *A. reflexus* the throat is exvaginate, being inside out and reflexed and sheathing the upper 1–3 mm. of the perianth-tube. The lobes, short to elongate,

are strongly reflexed and parallel the commonly somewhat curved tube. The stamens consequently are very long-exserted and conspicuous. After anthesis the limb and its lobes shrink to form a tumid margin to the sub-tubular perianth-tube, which remains attached and erect for some time on the ripening fruit.

It is a curious fact that the known stations for *A. reflexus* lie in an area along the Rio Grande between the districts in which *A. leiosolenus* and its var. *lasianthus* are known. The species probably ranges southwest into Chihuahua, for while traveling by railroad from Chihuahua to Ojinaga in 1941 I observed an *Anulocaulis*, most likely this species, on the extensive gypsum beds just west of the Rio Conchos.

Mirabilis linearis (Pursh) Heimerl, Ann. Cons. et Jard. Bot. Genève 5: 186 (1901).

Allionia linearis Pursh, Fl. Am. Sept. 728 (1814).

Oxybaphus linearis Robins. Rhodora 10: 31 (1908).

Allionia petrophila Standl. Contr. U. S. Nat. Herb. 12: 340 (1909).

COAHUILA: Sierra Encantada, mouth of Cañon San Enrique, bank of dry arroyo, erect, fl. lavender, *Stewart* 1377; base of Sierra Guajes, 7 km. east of Rancho Buena Vista, limestone hillside, erect, fl. reddish white, *Stewart* 1477; Valle de los Guajes, 10 km. south of Rancho Buena Vista, grassy hillside, erect, 1 m. tall, fl. purplish white, *Stewart* 1362; Valle de los Guajes, 20 km. south of Rancho Buena Vista, grassy flat, erect, fl. orchid, *Stewart* 1335; Sierra del Pino, ridge west of La Noria, erect, fl. burnt-orange or red, *Johnston & Muller* 611, 617; Sierra del Pino, flats at La Noria, fl. whitish, *Johnston & Muller* 426; tableland north of Cañon Cuervo Chico, slopes of low limestone hill, decumbent on grassy slope, *Johnston* 8555; south base of Sierra Hechiceros, 6 km. east of El Tule, open flat, fl. orchid, *Stewart* 483. CHIHUAHUA: High valley on northwest end of Sierra Diablo, hillsides and meadows, fl. purple, *Stewart* 964; rocky hills northwest of Chihuahua, Sept. 1886, *Pringle* 840 (isotype of *A. petrophila*).

Widely distributed in central parts of the United States and south through Arizona, New Mexico, and western Texas into our area.

A plant with the leaves linear or narrowly lanceolate and very gradually attenuate below into a more or less well-developed petiole. The stems and leaves are usually whitish and glabrous or practically so. The inflorescence and the involucre are usually viscid-villous with fulvous hairs. Over most of its range this species has narrow leaves rarely more than 6 mm. wide. In Texas, however, forms with the blade wider (up to 12 mm.) are not uncommon. Among the collections cited above, three are atypical, *Stewart* 1377 and *Johnston & Muller* 426 having green sparsely hairy involucres and the uppermost leaves broadened at the base, and *Stewart* 483 having the leaves above the middle of the stem thin, green, rather broad, and with the base rounded and subsessile.

Mirabilis pseudaggregata Heimerl, Ann. Cons. et Jard. Bot. Genève 5: 183 (1901).

Mirabilis pseudaggregata f. *subhirsuta* Heimerl, l.c. 184.

Mirabilis pseudaggregata f. *eglandulosa* Heimerl, l.c. 184.

Allionia pseudaggregata Standl. Contr. U. S. Nat. Herb. 12: 356 (1909).

Allionia pseudaggregata subhirsuta Standl. Contr. U. S. Nat. Herb. 12: 356 (1909).

Oxybaphus pseudaggregatus Weatherby, Proc. Am. Acad. 45: 425 (1910).

COAHUILA: Sierra Hechiceros, Cañon Indio Felipe, base of talus slope, *Stewart* 34; 7 mi. south of Jaco, in shade inside mogote, *Johnston & Muller* 1117. CHIHUAHUA: Hills northeast of Chihuahua, cool slopes, Aug. 30, 1886, *Pringle* 793 (isotype).

A light green, sprawling, much-branched plant with very scanty and inconspicuous pubescence and abundant narrowly lanceolate leaves, which are gradually attenuated below into a distinct petiole. The leaves in form, size, texture, and color are similar to broad-leaved forms of *M. linearis* found in trans-Pecos Texas. It is possible that *M. pseudaggregata* may be merely a shade form of *M. linearis*. Most of its flowers are cleistogamic. It differs from *M. linearis* in its leafy elongate slender much branched sprawling stems and its scantily pubescent inflorescence and involucre. From *M. attenuata*, of central Mexico, it differs in its thinner more attenuate and more distinctly petiolate leaves and scanty pubescence. I know *M. pseudaggregata* only from the collections cited above.

Mirabilis glabra (Wats.) Standl. Field Mus. Publ. Bot. 8: 304 (1931).

Oxybaphus glaber Wats. Am. Nat. 7: 301 (1873).

Allionia glabra Kuntze, Rev. Gen. 2: 533 (1891).

Oxybaphus glaber var. *recedens* Weatherby, Proc. Am. Acad. 45: 425 (1910).

Allionia glabra recedens Standl. Contr. U. S. Nat. Herb. 13: 406 (1911).

CHIHUAHUA: Sandhills south of Samalayuca, Sept. 20, 1886, *Pringle 1126*; dunes near Samalayuca, 1935, *LeSueur 390*; between Casas Grandes and Sabinal, 1899, *Nelson 6351* (type of var. *recedens*).

Southern Utah to northern Chihuahua. A relative of *M. linearis*, differing in its glabrous or nearly glabrous stems, leaves, and fruit. The involucre is rather small, single-flowered, glabrous or nearly so, and more deeply lobed and less spreading than in *M. linearis*. In recognizing the species I am emphasizing the characters of the involucre and the associated glabrous fruit. Standley seems to have admitted to this species some plants which I would classify as glabrous-fruited *M. linearis*.

Mirabilis coahuilensis (Standl.) Standl. Field Mus. Publ. Bot. 8: 305 (1931).

Allionia coahuilensis Standl. Contr. U. S. Nat. Herb. 12: 347 (1909).

Oxybaphus coahuilensis Weatherby, Proc. Am. Acad. 45: 425 (1910).

COAHUILA: Sierra Gloria, *Marsh 1908*; Saltillo, 1898, *Palmer 158* in pt. (ISOTYPE); Sierra Madera, Cañon del Agua, open oak woods, *Muller 3246A*; Sierra Madera, Cañon Charretera, in oak thicket, erect, *Johnston 8942, 9137*; central Sierra del Pino, head of Cañon Ybarra, dry hillside, erect, *Stewart 1259*; Cañon del Cuervo Chico, among bushes, *Johnston 8509*; Parras, 1880, *Palmer 1113*. CHIHUAHUA: Sierra Rica, Cañon Madera, *Stewart 2460, 2498, 2498A*; 12 km. north of Escobillas, rocky slope in bushes, *Stewart 2379*; mountains northwest of Chihuahua, 1936, *LeSueur 615*. DURANGO: Near Pasaje, fl. purple, *Shreve 9125*. NUEVO LEON: Arroyo Hondo, Hac. San José de Raices, *Mueller 2287A*; between Cieneguillas and Puerto Santa Ana, 15 mi. southwest of Galeana, *Mueller 914*; between Encinal and Pablillo, about 15 mi. southwest of Galeana, *Mueller 1049*. TEXAS: High rocky hills of the Pecos (western Crockett Co.?), June 1, 1851, *Wright s. n.*; Chisos Mts., Aug. 1883, *Havard 67*; Mt. Emory, Chisos Mts., *Cory 7132*; near Boot Springs, Chisos Mts., *Cory 7305, Mueller 7995, Moore & Steyermark 3180*; Mt. Livermore, Davis Mts., Aug. 1935, *Hinckley*.

Western Texas south through our area into Durango and Nuevo Leon. An erect plant with lanceolate leaves which are abruptly contracted into distinct petioles. Even the uppermost leaves have short petioles. The leaves of the middle stem commonly have petioles a centimeter long, sharply set off from the obtuse, rounded, or broadly acute base of the blade. Most plants are glandular and pubescent in the inflorescence and inconspicuously hairy or glabrous below. The type collection is unusual

in being conspicuously viscid-villous and tawny down to below the middle of the plant. Fosberg, *Lloydia* 4: 281 (1941), reports, sub *M. aggregata*, some excessively hairy plants similar to the type of *M. coahuilensis*, among Muller's collection (no. 3246) from Cañon del Agua in the Sierra Madera. Most of Muller's collection represented the common nearly glabrous form of the species.

Mirabilis oblongifolia (Gray) Heimerl, Ann. Cons. et Jard. Bot. Genève 5: 183 (1901). *Oxybaphus nyctagineus* var. *oblongifolius* Gray in Torr. Bot. Mex. Bound. 174 (1859).

Allionia oblongifolia Small, Fl. S. E. U. S. 407 (1903).

Allionia Greggii Standl. Contr. U. S. Nat. Herb. 12: 347 (1909).

COAHUILA: Sierra del Carmen, Sept. 1, 1936, *Marsh* 882; Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller* 622; San Antonio de las Alanzanas, frequent, 2 ft. tall, fl. red, *Gregg* 348; Carneros area, 1880, *Palmer* 111; mountains 24–26 km. northwest of Fraile, *Stanford et al.* 400, 448. CHIHUAHUA: Sierra Almagre, decumbent in leaf-mould in deep shaded canyon, *Johnston & Muller* 1180. NUEVO LEON: Near Monterrey, 1933, *Mueller* 283. TEXAS: Near Del Rio, "prairies of the San Felipe," Val Verde Co., July 11, 1849, *Wright* 604 (TYPE); Del Rio, along San Felipe Creek, *Cory* 8968; Altuda Mt., upper canyons, Ord Mts., Brewster Co., limestone, 1940, *Warnock* 32; Blue Creek, Chisos Mts., *Cory* 6989, *Moore & Steyermark* 3342; "Mountains of Cibola" (Chinati Mts.), Presidio Co., *Bigelow*; Chinati Mts., 1881, *Havard* 98.

I have associated under the present species a group of plants ranging from western Texas south through our area into Nuevo Leon. The plants are loosely branched, with ascending or decumbent stems, and are usually dusky and glandular throughout. The distinctly petiolate leaves are ovate or broadly oblong and have a broadly obtuse or cordate base. Most plants have at least a few distinctly cordate leaf-bases. Most of them appear to come from sheltered canyons and slopes and their characteristic glandularity is not readily explained away as a xerophytic modification. Their loose habit and rather thin broadish leaves are suggestive of a shaded habitat.

Perhaps also to be included in *M. oblongifolia* is the type of *Allionia comata* Small, Fl. S. E. U. S. 407 (1903), which was collected by Wright (no. 1718), Aug. 20, 1851, on the stony hills near the Coppermines, in Grant Co., New Mexico. This has the loose habit, dark color and glandularity, and rather thin leaves of the Coahuilan plants, but the leaves, though broadly ovate and petiolate, are not distinctly cordate at the base. I suspect, however, that it is only an aberrant shade form of the distinctive Arizonan and New Mexican plant described by Standley as *Allionia pratensis* and *A. melanotricha*, which Wright also collected about the Coppermines.

Mirabilis sp.

COAHUILA: San Antonio de los Alamos, base of the tuff cliffs on talus, *Johnston* 8274; highest peaks of the Sierra Cruces, open rocky hillside, *Stewart* 1146; north end of the Bolson de los Lipanes, west of Rancho Leja, among cacti, *Johnston & Muller* 1256.

The three collections cited form a uniform series and probably represent an undescribed species allied to *M. oblongifolia* and *M. coahuilensis*. They are pale green plants with a very inconspicuous pubescence and scarcely any glandularity. They have ovate cordate long-pediceled leaf-blades. Super-

ficially they are most suggestive of *M. glabrifolia* in habit, but upon close inspection differ in having hairy strongly ribbed non-tuberculate fruit, more sparsely pubescent inflorescence, the stem leafy up to the inflorescence, and rather large perianths.

***Mirabilis glabrifolia* (Ort.) comb. nov.**

Calyxhymenia glabrifolia Ortega, Nov. Pl. Dec. 1: 5. t. 1 (1797).

Mirabilis corymbosa Cav. Icones 4: 55. t. 379 (1798).

Allionis corymbosa var. *texensis* Coulter, Contr. U. S. Nat. Herb. 2: 351 (1894).

Allionia texensis Small, Fl. S. E. U. S. 406 (1903).

? *Allionia deltoidea* Standl. Contr. U. S. Nat. Herb. 13: 405 (1911).

COAHUILA: Saltillo, summit of stony mountain, fl. pink, *Palmer 326*; valley north of Saltillo, frequent, 1-2 ft., fl. reddish purple, Sept. 19, 1848, *Gregg 445*; Cañon Milagro, Sierra Guajes, 12 km. west of Hac. Encantada, shade in canyon, fairly common, fl. orchid, *Stewart 1732*; Cañon Ybarra, Sierra del Pino, arroyo, erect, fl. lavender or purplish, *Stewart 1831, 1913*; Sierra del Pino, mouth of main south canyon, hillside, erect, fl. orchid, *Stewart 1190*; west base of Picacho del Fuste, gravelly flat, erect, among bushes, *Johnston 8350*; Sierra Mojada, Cañon Hidalgo, open slope below crest, erect, fl. purple, *Stewart 1089*; mouth of Cañon Blanco, north end of Valle Delicias, arroyo banks, erect, fl. purple, *Stewart 2903*; Parras, 1880, *Palmer 1112*; Sierra Parras, Oct. 1910, *Purpus 4688*; Sierras Negras, 9 km. south of Parras, *Stanford et al. 207*; summit of Picacho de Jimulco, *Stanford et al. 97*. CHIHUAHUA: 10 km. south of San José del Progreso, south end of Sierra Seca, silty slope, frequent, *Stewart 2298*; Sierra Santa Eulalia, Sept. 19, 1885, *Pringle 542*. ZACATECAS: Mountain 18 km. west of Concepcion del Oro, *Stanford et al. 567, 567A*. TEXAS: North base of the Eagle Mts., Hudspeth Co., Sept. 3, 1849, *Wright 605* (isotype of var. *texensis*).

From trans-Pecos Texas south through our area to southern Mexico. A perennial with a few erect slender stems, commonly supported by bushes. The leaves are borne below the middle of the stem and are frequently crowded at the base. They are long-petiolate and have an ovate or oblong blade which is usually glabrous and has a truncate, rounded, or strongly cordate base. The fruit is tuberculate and glabrous.

Past writers have consistently accepted the name "*corymbosa*" for this species and as consistently cited Ortega's *Calyxhymenia glabrifolia* as a synonym. However, in the paragraph preceding that in which he published *M. corymbosa*, Cavanilles states that Ortega's work was already published. *Calyxhymenia glabrifolia* Ort. undoubtedly has priority over *Mirabilis corymbosa* Cav. Both were based on plants growing in the Royal Botanic Garden at Madrid during the summer of 1797.

I have not seen any authentic material of *Allionia deltoidea* Standl., a species based upon *Nelson 3823*, collected in Aug. 1898, at La Ventura, Coah. The original description fits the present species reasonably well. Standley, No. Am. Fl. 21: 229 (1918), in a later work, treated *A. deltoidea* as a synonym of *A. ciliata*. Unless the original description is grossly inaccurate this must be a mistake.

***Mirabilis rotata* (Standl.) comb. nov.**

Allionia rotata Standl. Contr. U. S. Nat. Herb. 12: 347 (1909).

Oxybaphus rotatus Weatherby, Proc. Am. Acad. 49: 492 (1913).

COAHUILA: La Azufrosa, scarce, 2 ft. tall, Sept. 22, 1848, *Gregg 511* (ISOTYPE); San Antonio de los Alamos, shelter of tuff-cliffs, erect, *Johnston & Muller 890*; Picacho de San José, dry arroyo bank, erect, *Johnston & Muller 815*; Laguna del Rey, gypsum

on plain, scarce, erect, *Stewart 3016*; north of Puerto Ventanillas, south of Las Delicias, in arroyo, scarce, erect, fl. purple, 45 cm. tall, *Stewart 2791*. CHIHUAHUA: Sierra Diablo, near mouth of Cañon Rayo, dry open hillside, 7 dm. tall, not common, fl. purplish, *Stewart 934*. TEXAS: Fresno Canyon, 4-5 mi. above Arroyo Segundo, southeastern Presidio Co., a few plants sheltered by shrubs on flat, *Hinckley 2277*.

Known only from Coahuila and adjoining Chihuahua and Texas. Closely related to *M. glabrifolia* but a more herbaceous somewhat succulent plant, glandular-pubescent throughout and with a glandular-puberulent fruit roughened by very prominent dorsiventrally flattened tuberculations. The tuberculations on the angles of the fruit are very suggestive of diminutive shelf-fungi. In his latest work on the genus, Standley, No. Am. Fl. 21: 219 (1918), cited the present species as a synonym of *M. viscosa* Cav. *Mirabilis rotata* might possibly be dismissed as a variety of *M. glabrifolia*, but it can not be identified with *M. viscosa*, for that is a coarse bushy annual with a paniculate inflorescence that consists of a straight indeterminate axis bearing numerous opposite floral branches. The present species has the habit of *M. glabrifolia*, producing from a perennial root a few subsimple slender stems terminated by a forking somewhat corymbose inflorescence.

Mirabilis Jalapa L. Sp. Pl. 177 (1753).

VERNACULAR NAME: Maravilla.

COAHUILA: Palm Canyon, Mariposa Ranch, Sept. 19, 1936, *Marsh 977A*; San Antonio de las Alanzanas, 2 ft. tall, frequent, fl. red, Aug. 31, 1848, *Gregg 344*.

Warmer regions of America, a Mexican species now widely dispersed as a garden plant and as an escape from cultivation. The cited specimens seem to agree with the commonly cultivated form of the species and probably are escapes from cultivation. Gregg, however, notes on his collection that it was "evidently a wild plant." In any case the Texan var. *Lindheimeri* (Standl.) Cory, native along the escarpments of the Edwards Plateau and readily recognized by its broad leaves, can be expected indigenous in northern Coahuila.

Mirabilis longiflora L. Sv. Vet.-Akad. Handl. 1755: 176 (1755).

Mirabilis Wrightiana Gray ex Britt. & Kearney, Trans. N. Y. Acad. 14: 28 (1894).

Mirabilis Wrightiana var. *tubiflora* Heimerl, Notizbl. Bot. Gart. Berlin 11: 450 (1932).

Mirabilis longiflora var. *Wrightiana* Kearney & Peebles, Jour. Wash. Acad. 29: 475 (1939).

VERNACULAR NAME: Maravilla.

COAHUILA: Sierra del Carmen, Cañon Sentenela, *Wynd & Mueller 585*; canyon above Palomas, northeast of Saltillo, vine-like, 3 ft. tall, scarce, fl. white, Aug. 31, 1848, *Gregg 331*; escarpment above mines on west side of Potrero de la Mula, one colony on sunny ledge just below crest, *Johnston 9246*; Sierra Hechiceros, Cañon Indio Felipe, shady places, 4-10 dm. tall, fl. white, *Stewart 68, 114*; Sierra Mojada, Cañon Calabasa, shade in deep canyon 100 m. below crest, erect, *Stewart 2208*. CHIHUAHUA: Sierra Rica, Cañon Madera, shade on slope, fl. white, *Stewart 2501*; 7 mi. northwest of Temporales de Honorato, in mogote, loosely branched, up to 2 m. tall, perianth white, anthers magenta, *Stewart & Johnston 1986*; high valley on northwest end of Sierra Diablo, slopes, 4-11 dm. tall, fl. white, *Stewart 960*.

Arizona to trans-Pecos Texas south into our area and along the eastern and western Sierra Madre to southwestern Chihuahua and southwestern

Tamaulipas; reappearing in central and southern Mexico. Standley, Contr. U. S. Nat. Herb. 13: 416-17 (1911), reports the plant from Gallejo Spring, between Chihuahua and El Paso (*Wislizenus* 122), and from the "Santa Eulalia Plains" (*Wilkinson*). A leafy much-branched herb with elongate ascending stems, usually found in thickets. The elongate trumpet-shaped perianth is white. It appears to be an uncommon plant in our area. Our collections are referable to var. *Wrightiana*, the northern form, differing from the typical plant of central Mexico in its smaller much less glandular more distinctly petiolate leaves and somewhat smaller perianths with a more slender and less glandular tube.

Mirabilis multiflora (Torr.) Gray in Torr. Bot. Mex. Bound. 173 (1859).

Quamoclidion multiflorum Torr. ex Gray, Am. Jour. Sci. II. 15: 321 (1853).

COAHUILA: Hillcoat Mesa lying west of Encantada Ranch, July 25, 1938, *Marsh* 1464A; west slopes of the Sierra del Carmen, 8 km. northeast of Hac. Encantada, common on grassy flats, erect, fl. lavender, *Stewart* 1573; high mesa 4 km. north of Rancho Buena Vista, grassy flat, prostrate, not common, fl. orchid, *Stewart* 1448. CHIHUAHUA: Samalayuca, 1935, *LeSueur* 396; hills northeast of Chihuahua, Aug. 13, 1885, *Pringle* 547.

Utah and Arizona east to Colorado and trans-Pecos Texas, and south in Chihuahua, Coahuila, and Nuevo Leon.

Mirabilis oxybaphoides Gray in Torr. Bot. Mex. Bound. 173 (1859).

Allioniella oxybaphoides Rydb. Bull. Torr. Bot. Cl. 29: 687 (1902).

Mirabilis oxybaphoides f. *glabrata* Heimerl, Ann. Cons. et Jard. Bot. Genève 5: 180 (1902).

COAHUILA: Sierra del Pino, crest of high ridge west of La Noria, among low bushes, very glutinous, fl. pink, *Johnston & Muller* 603; Sierra Mojada, Cañon Calabasa, shaded places in deep canyon 100 m. below crest, prostrate, fl. white, *Stewart* 2209.

From Arizona, southern Colorado, and trans-Pecos Texas south into Coahuila. The plant from the Sierra del Pino, growing on an exposed ridge, is distinctly hairy and glandular and has thickish grayish leaves 15-30 mm. wide. The material from Sierra Mojada, growing in a shaded canyon, is practically glabrous and has thin green leaves 40-60 mm. wide. The two collections represent the extremes in this variable species. The species was based on *Wright* 596 and 1721, consisting of material collected Sept. 12, 1849, on mountains near El Paso, on Oct. 14, 1849 about large rocks apparently near Hueco Tanks, El Paso Co., Texas, and on Oct. 5, 1851, in mountain-ravines on apparently the east side of Guadalupe Pass in Hidalgo Co., southwestern New Mexico. All represent the form of the species with large green thin very sparsely pubescent leaves. Heimerl's var. *glabrata*, accordingly, represents the typical form of the species.

Abronia carnea Greene, Pittonia 3: 343 (1898).

Abronia cycloptera sensu Standley.

CHIHUAHUA: Near Juarez, sandhills, May 5, 1885, *Pringle* 75.

Southern New Mexico, adjacent Texas, and adjoining Chihuahua; sandy places. The name "*Abronia cycloptera* Gray," currently applied to the present species, is merely a renaming of *A. micrantha* Torr. Standley, Contr. U. S. Nat. Herb. 12: 329 (1909), recognized this fact, but, because Gray's binomial was familiar to him, he deliberately retained it for our

present plant, citing it as follows: "*Abronia cycloptera* A. Gray, Am. Jour. Sci. II. 15: 319. 1853, excluding synonyms." If this procedure is followed, the binomial, expressedly given by Gray as a substitute for *A. micrantha* Torr., is left as a *nomen nudum*, for Gray gave no description of the species. Obviously, Standley's application of the name *A. cycloptera* is improper. The name belongs in the synonymy of *A. micrantha* as a non-valid illegitimate synonym.

Abronia angustifolia Greene, Pittonia 3: 344 (1898).

Abronia Torreyi Standl. Contr. U. S. Nat. Herb. 12: 319. t. 38 (1909).

CHIHUAHUA: Juarez, sandy soil, Rio Grande Valley, May 5, 1901, *Pringle* 9465; Los Medanos, 1935, *LeSueur* 169, 393.

Trans-Pecos Texas (Brewster and Davis Counties) west to Arizona and south into northern Chihuahua, usually in sand. Flowers pinkish red.

Abronia fragrans Nutt. ex Hook. Jour. Bot. & Kew Misc. 5: 261 (1853).

Abronia Fendleri Standl. Contr. U. S. Nat. Herb. 12: 324. t. 43 (1909).

CHIHUAHUA: Sandhills south of Samalayuca, Sept. 20, 1886, *Pringle* 794; Los Medanos, 1935, *LeSueur* 389.

Texas to South Dakota, west to Idaho and New Mexico, and south into northern Chihuahua. A plant of sandy places. The flowers are white or pinkish.

ARNOLD ARBORETUM,
HARVARD UNIVERSITY.

PLANTAE PAPUANAE ARCHBOLDIANAE, XIV*

E. D. MERRILL AND L. M. PERRY

THE Rubiaceae, brought together in the collections made by the Richard Archbold Expeditions and from other sources, is only one of the groups which we had hoped could be elaborated by our colleagues abroad. In all large families a specialist, familiar with details of classification, is always in a strategic position when it comes to rendering final opinions regarding the status and relationships of any particular form. As the present war deepened, it has been impossible for us to maintain our contacts with or to transmit specimens to our associates in Europe, who not only were willing to study the representatives of particular groups, but also were better qualified through accumulated knowledge and experience to handle the material more skilfully than we could possibly hope to do. Under these circumstances and with considerable reluctance on our part, we have undertaken a study of this and of certain other families of plants. It would seem to be particularly essential that we make accessible for future studies these plants already assembled, in view of the fact that there is a possibility of receiving supplementary collections from the Southwestern Pacific area; this can be done only by carrying the identifications in all groups as far as possible on the basis of literature and specimens available for study and comparison. The remaining genera of the Rubiaceae will be considered in another paper. In general, we have followed the work of Valetton rather closely, but we do not consider our efforts, as herein presented, in any sense as a monographic treatise.

RUBIACEAE (in part)

Bikkia Reinwardt

Bikkia Commersoniana K. Schum. var. *latifolia* Valetton, Bot. Jahrb. 60: 3. 1925.

SOLOMON ISLANDS: Three Sisters: Aliti, *Brass* 2998, October 1932, sea beach, common (small tree 3–5 m. high; branchlets and leaves fleshy; corolla 4-angled, pale pink). New Guinea and the Bismarck Archipelago.

This specimen is an excellent match for *Warburg* 21495 from the Bismarck Archipelago. *Bikkia Bridgeana* F. v. Muell., (extra-print from) Vict. Nat. Feb. 1885, ought to be compared with this species and variety as well as with *B. Pancheri* (Brongn.) Guill. The latter, represented here by a single collection from New Caledonia, has been reported from the Solomon Islands, but it appears to be distinct from the material cited above.

Dolicholobium A. Gray

Dolicholobium leptocarpum sp. nov.

Arbor 10 m. alta; ramulis teretibus maturis glabris cinerascentibus;

*Botanical Results of the Richard Archbold Expeditions. See Jour. Arnold Arb. 24: 422–439. 1943.

stipulis elongatis, 2–3.5 cm. longis adpresse villosulis et parce longe patentipilosis; foliis lanceolato-ellipticis, 12–21 cm. longis, 4–6.5 cm. latis, utrinque angustatis, basi cuneatis vel subobtusis, apice obtuse longiuscule acuminate, supra glabris, subtus novellis dense maturis parce (costa nervisque dense) pilosulis, nervis lateralibus utrinsecus \pm 16 patenti-adscendentibus marginem versus arcuatis, reticulo subtus manifesto; petiolo 1.5–2.5 cm. longo, adpresse villosulo et parce longe patentipiloso; inflorescentiis in axillis superioribus; pedunculo \pm 2 cm. longo ceterum ut petiolo; floribus δ 4, pedicellis sericeo-pilosulis, 1.5 cm. longis; calycis tubo 0.5 mm. longo, glabrato truncato ciliato; corolla in alabastro 1.5 cm. longa, glabra; flore η centrali sessili, calycis limbo 1.5 (–3 in fructu) mm. longo utrinque pilosulo, margine 5-lobato, lobis 0.5 (–1) mm. longis; corolla glabra, tubo 11 mm. longo, lobis 1.7 cm. longis basi 3.5 mm. latis; antheris 2.5 mm. longis; stigmatis lobis (7 mm.) paullo stylo (6 mm.) longioribus; ovario 2.6 cm. longo adpresse villosulo; fructibus immaturis circiter 25 cm. longis et 1.5 mm. diametro, parce pilosulis sulcatis.

NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, *Brass 13887* (TYPE), April 1939, alt. 70 m., rain-forest on lower mountain slopes (substage tree 10 m. high; flowers white).

In the general habit and the glabrous corolla, the species suggests *Dolicholobium rubrum* Schlechter ex Valetton, but it differs in the smaller flowers and the very long slender fruits.

***Dolicholobium Kajewskii* sp. nov.**

Frutex 2 m. altus; ramulis teretibus, novellis pubescentibus cito glabratiss; stipulis oblongis, 1.5–2.5 cm. longis, 0.5–0.9 cm. latis, novellis dense hirsutis, maturis glabratiss; foliis ellipticis vel ovato-ellipticis, 7.5–12 cm. longis, 4–7 cm. latis, basi subrotundatis vel obtusis, apice obtusissime acuminatis, supra glabris, subtus costa nervisque parce pubescentibus (novellis supra fere glabris subtus dense adpresse villosis), nervis lateralibus utrinsecus 8 vel 9, venis inconspicuis; petiolo 1.5–3 cm. longo, parce hirsuto vel glabrato; pedunculo 1–2 cm. longo, pubescente; floribus δ 3 vel 4, pedicellis \pm 1.5 cm. longis, adpresse pilosis; calycis limbo 1 mm. longo, glabro ciliato; corolla in alabastro adpresse pilosula, tubo 1.5 cm. longo gracili, lobis 1.5 cm. longis oblongo-linearibus; antheris 5 mm. longis; flore centrali η sessili; calycis tubo 3.5 mm. longo, margine sinuato, adpresse pilosulo; corollae tubo 1 cm. longo extus pilosulo, lobis 2 cm. longis, linearibus; ovario 1.5 cm. longo, adpresse hirtello; stigmatis lobis spatulatis.

SOLOMON ISLANDS: Guadalcanal: Uulolo, Tutuve Mountain, *Kajewski 2577* (TYPE), April 1931, alt. 1200 m., rain-forest (shrub up to 2 m. high; young leaves very hairy; petals cream).

Dolicholobium Kajewskii differs from *D. solomonense* in the smaller leaves, hirsute stipules, and smaller flowers.

***Dolicholobium Brassii* sp. nov.**

Arbuscula; ramulis pallide brunneis glabris; stipulis oblongis anguste obtusiusculis, circiter 1.5 cm. longis et 4 mm. latis, margine ciliatis ceterum fere glabris; foliis lanceolato-ellipticis, 5–11 cm. longis, 2–5 cm. latis, utrinque angustatis, apice acutis vel breviter obtuse acuminatis, basi cuneatis, maturis utrinque glabris, juvenilibus supra glabris, subtus nervis et margine sericeo-pilosis; nervis lateralibus utrinsecus circiter 10 patentipilosis.

adscendentibus versus marginem arcuatis; petiolo 1–2 cm. longo glabro; inflorescentiis in axillis superioribus; pedunculo 0.5–1.5 cm. longo; floribus ♂ 3 vel 4, pedicellis circiter 2 mm. longis; calycis limbo 1 mm. longo latoque, corollae tubo (in alabastro) 1.3 cm. longo, lobis 1 cm. longis, antheris 1 cm. longis; flore centrali ♀ subsessili; calycis limbo subcampanulato truncato vel minute 5-dentato, 3 mm. longo, 2.5 mm. lato, extus glabro intus adpresse piloso; corolla hypocrateriformi, tubo 1 cm. longo versus apicem extus parce pubescente, lobis 5 circiter 1 cm. longis vix 3 mm. latis, anguste oblongis obtusis, basi oblique anguste auriculatis, antheris 5 circiter 2 mm. longis; stigmatis lobis spathulatis inclusis; ovario adpresse pubescente, 1.5 cm. longo, lineari; capsulis immaturis 10–12 cm. longis, 1.5 mm. diametro, glabratis, leviter sulcatis.

SOLOMON ISLANDS: San Cristobal: Huru, *Brass 3005* (TYPE), October 1932, lowlands (small river-bank tree; leaves very dull dark green; flowers white).

This species is readily recognized by the small flowers, the slender fruits, and its nearly glabrous character.

Dolicholobium solomonense sp. nov.

Arbuscula 4–5 m. alta; ramulis compressis, novellis pubescentibus; stipulis ellipticis, 1.5–2.5 cm. longis, 0.6–1 cm. latis, velutino-pubescentibus; foliis ellipticis vel leviter obovatis, 12–31 cm. longis, 5.5–17 cm. latis, basi obtusis, apice acuminatis, acumine 1–2 cm. longo 0.5–1 cm. lato, novellis villosulis cito glabris, maturis supra glabris, subtus (costa nervisque dense) pilosis, nervis lateralibus utrinsecus \pm 14 oblique adscendentibus, venis inconspicuis subclathratis; petiolo 2–6 cm. longo pubescente vel glabrato; pedunculo 1–2 cm. longo patenti-pubescente; floribus ♂ 4–7, pedicellis \pm 2 cm. longis, pubescentibus; calycis limbo vix 1 mm. longo, glabrato; corolla in alabastro 3 cm. longa extus adpresse villosula; flore centrali ♀ sessili; calycis limbo 4 mm. longo latoque, extus glabrato margine ciliato; corolla hypocrateriformi, tubo 1 cm. longo adpresse piloso, lobis 2.5–3 cm. longis, in parte media 4 mm. basi 6.5 mm. latis, oblique auriculatis, antheris 3 mm. longis; stigmatis lobis spathulatis vix exsertis; ovario 2.3 cm. longo, 2 mm. lato, velutino.

SOLOMON ISLANDS: San Cristobal: Waimamura, *Brass 2656, 2850* (TYPE), August, September, 1932, lowland rain-forests (slender tree 4–5 m. tall; leaves paler beneath; flower cream-colored).

In some features this species suggests *Dolicholobium Gertrudis* K. Schum., but the ♀ flowers are sessile rather than pedicellate.

Dolicholobium ulawaense sp. nov.

Arbor gracilis 10 m. alta; ramulis subangulatis glabris; stipulis obovato-ellipticis, \pm 2.2 cm. longis et 1.3 cm. latis, apice rotundatis, utrinque pubescentibus cito glabris, margine ciliatis; foliis obovato-ellipticis, \pm 26 cm. longis et 16 cm. latis, basi obtusiusculis, apice abrupte brevissime et obtuse acuminatis, acumine 7 mm. longo latoque, supra glabris, subtus (costa nervisque dense) pilosis, nervis lateralibus utrinsecus \pm 17 oblique adscendentibus, venis inconspicue clathratis; petiolo 3 cm. longo, pubescente vel glabrato; inflorescentiis in axillis superioribus; pedunculo 3 cm. longo, dense villosulo; floribus ♂ 9 vel 10, pedicellis glabris 1–1.5 cm. longis; calycis limbo campanulato, 1 mm. longo, 1.5 mm. lato; corollae tubo 1.5 cm. longo, villosulo, lobis 1.5 cm. longis, antheris 4.5 mm. longis;

flore centrali ♀ sessili; calycis limbo extus glabrato intus dense pubescente, truncato, 4 mm. longo latoque; corolla hypocrateriformi, tubo 1 cm. longo, adpresse piloso, lobis 1.3–1.5 cm. longis in parte media 4 mm. latis (in alabastro extus adpresse villosulis) oblongo-lanceolatis, basi 6 mm. latis oblique auriculatis; antheris 2.5 mm. longis; stigmatibus lobis spathulatis paulo exsertis; ovario adpresse villosulo, 1.5 cm. longo, 3 mm. lato.

SOLOMON ISLANDS: Ula wa: *Brass* 2967 (TYPE), October 1932, alt. 200 m., rain-forest, common (slender tree 10 m. tall; flower white).

The species differs from the preceding chiefly in the relative size of the parts of the flower, *Dolicholobium solomonense* having very long almost ligulate corolla-lobes and a slender ovary, whereas *D. ulawaense* has shorter and broader corolla-lobes and a shorter broader ovary. There is also a difference in the size and the pubescence of the stipules.

***Dolicholobium callianthum* sp. nov.**

Arbuscula 6 m. alta; ramulis apicem versus subcompressis glabris; internodiis brevissimis; stipulis non visis; foliis obovatis, apice breviter obtuse acuminatis, acumine 1 cm. longo latoque, basi cuneatis, 25–30 cm. longis, 13–16 cm. latis, novellis 8–12 cm. longis, 3.5–5.5 cm. latis, utrinque adpresse villosis, maturis glabris vel subtus costa nervisque inconspicue pubescentibus; nervis lateralibus utrinsecus 10–14 patentibus adscendentibus marginem versus arcuatis, venis subclathratis; petiolo 2.5–3 cm. longo, glabro; pedunculo 5 mm. longo, villosulo; floribus ♂ pedicellatis, pedicellis 2–5 mm. longis ± villosulis; calycis tubo 2 mm. longo subglabro; corollae tubo in alabastro 2.5–3 cm. longo, adpresse villosulo, lobis ± 1 cm. longis; antheris 1 cm. longis; flore ♀ subsessili, calycis tubo 8 mm. longo, truncato, adpresse villosulo; corollae tubo 3–3.5 cm. longo extus adpresse villosulo, lobis 6 oblongis, 3.5 cm. longis, 1 cm. latis, intus supra faucem parce pubescentibus; antheris supra medium tubo insertis, 3 mm. longis; ovario 2.5 cm. longo, dense adpresse villosulo; stigmatibus lobis oblongo-clavatis; capsulis (fide Kajewski) 20 cm. longis, 6 mm. diametro.

SOLOMON ISLANDS: Guadalcanal: Uulolo, Tutuve Mountain, *Kajewski* 2655 (TYPE), May 1931, alt. 1200 m., rain-forest (small bushy tree 6 m. high; young leaves covered with silky hair; flowers white, very showy, pleasantly scented; fruit 20 cm. long, 6 mm. diameter).

This species is closely related to *Dolicholobium acuminatum* Burk., differing in the longer pubescence on the lower surface of the young leaves and also in the calyx. This is longer and narrower than in Burkill's species and truncate; both differ from the other Solomon Islands species in that the ♂ flowers have pedicels considerably shorter than the ovary of the ♀ flower in the same cluster.

***Coptosapelta* Korthals**

***Coptosapelta Carrii* sp. nov.**

Planta scandens; ramulis, petiolis et inflorescentiis crispe tomentosis; foliis ellipticis, 5–8 cm. longis, 2.5–4.5 cm. latis, basi rotundatis vel obtusis, apice abrupte et anguste acuminatis, acumine 5–10 mm. longo, chartaceis vel tenuiter coriaceis, supra glabris costa interdum crispe pilosulis, subtus (costa nervisque ± dense) crispe pilosulis, nervis primariis utrinsecus 3 arcuatim adscendentibus, supra impressis subtus prominulis, reticulo utrinque manifesto; stipulis inconspicuis, triangularibus, circiter 2 mm.

longis, subtomentosis; petiolo 5–8 mm. longo; inflorescentiis brachiatis terminalibus vel in axillis superioribus 3–25 cm. longis, floribus subsessilibus vel breviter pedicellatis; calycis lobis ovatis obtusis 0.6–0.8 mm. longis, subtomentosis; ovario dense subtomentoso globoso, 2 mm. longo; corollae lobis \pm 6 mm. longis oblongis acutiusculis, supra glabris, subtus partim adpresso-pilosulis, tubo circiter 5 mm. longo adpresso-pilosulo, intus glabro fauce retrorse pileosa excepta; filamentis 2 mm. longis dense patentipilosulis, antheris 4 mm. longis dorso adpresso-sericeo-pilosulis; disco 5-lobato; stylo 9 mm. longo.

BRITISH NEW GUINEA: Koitaki, Carr 12613 (TYPE in Herb. N.Y.B.G.), June 1935, alt. 450 m. (climber in forest; flowers white).

The leaves resemble those of *Coptosapelta flavescens* Korth. in their pubescence on the lower surface; the flower is like that of *C. hameliaeblasta* (Wernh.) Val. except that the corolla is smaller. The 5-lobed disk is perhaps a distinctive feature.

Badusa A. Gray

Badusa corymbifera (Forst. f.) A. Gray, Proc. Amer. Acad. 4: 308. 1859; Gillespie, Bishop Mus. Bull. 74: 28. f. 37. 1930.

Cinchona corymbifera Forst. f. Nova Acta Reg. Soc. Sci. Ups. II. 3: 176. 1780, Prodr. no. 88. 1786.

SOLOMON ISLANDS: Ysa bel: Cape Prieto, Brass 3472, January 1933, alt. 150 m., open hillsides, common (tall shrub or very slender small tree 2–3 m. tall; leaves pale with whitish midribs and nerves; flower pale pinkish white).

Polynesia. Forster's material was collected "intra tropicos in insulis Tongatabu et Eaoowe maris pacifici." The genus occurs in the Palau Islands, the New Hebrides, Fiji, and the Tonga Islands; new to the Solomon Islands.

Nauclea Linnaeus

(*Sarcocephalus* Afzelius)

Nauclea tenuiflora (Havil.) Merrill, Jour. Wash. Acad. Sci. 5: 537. 1915; Kaneh. & Hatus. Bot. Mag. Tokyo 53: 13. 1939.

Sarcocephalus tenuiflorus Haviland, Jour. Linn. Soc. Bot. 33: 32. 1897; Valetton, Bot. Jahrb. 60: 47. 1925.

NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, Brass 11854, 14033, January (flowering material) and April (fruiting material) 1939, alt. 50 m., rain-forest of river flood-plain, plentiful on banks of creeks (tree 4–6 m. tall; flowers white). Northeastern New Guinea.

Neonauclea Merrill

Neonauclea papuana (Val.) comb. nov.

Nauclea papuana Valetton, Nova Guin. Bot. 8: 449. 1911; op. cit. 14: 258. 1925.

BRITISH NEW GUINEA: Palmer River, 2 miles below junction Black River, Brass 6955, 7336, June, July 1936, alt. 100 m., common along banks of river; one of the principal components of the older seral forests on silt-loams along river (tree attaining 25 m.; flower-heads white or cream-colored, \pm 5 cm. diameter). Previously collected in Netherlands New Guinea.

Neonauclea Schlechteri (Val.) comb. nov.

Nauclea Schlechteri Valetton, Bot. Jahrb. 60: 50. 1925.

NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, Idenburg River, Brass & Versteegh 12595, February 1939, alt. 1200 m., on slope of ridge in primary

forest, rare (tree 20 m. high, with brown bark; flower-buds light green; fruit green-brown); 2 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh 13534*, April 1939, alt. 650 m., occasional in primary forest (tree 17 m. high, bark black, scaly; flowers white).

These collections agree reasonably well with an isotype of this species; also two sterile or fragmentary specimens collected on Japen Island by the Netherlands Indies Forest Service (*bb. 30534*, *bb. 30551*) may belong here. The type of *Neonauclea tenuis* (Havil.) Merr. ought to be compared with this species; Valetton points out the likeness, and the differences seem to be variable.

Neonauclea maluensis (Val.) S. Moore, Jour. Bot. 65: 242. 1927.

Nauclea maluensis Valetton, Bot. Jahrb. 60: 51. 1925.

NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, *Brass 11077*, November 1938, alt. 2200 m., secondary forest, rare (tree 12 m. high); 15 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh 11922*, January 1939, alt. 1720 m., occasional in rain-forest on steep slopes (tree 32 m. high; flowers yellow-green). Described from Northeastern New Guinea.

Neonauclea Dahlii (Val.) comb. nov.

Nauclea Dahlii Valetton, Bot. Jahrb. 60: 51. 1925. Known only from the Bismarck Archipelago.

Neonauclea obversifolia (Val.) comb. nov.

Nauclea obversifolia Valetton, Bot. Jahrb. 60: 52. 1925. Type from Northeastern New Guinea.

Neonauclea Versteeghii sp. nov.

Arbor 22 m. alta; ramulis brunnescentibus glabris cortice sulcato-ruguloso; internodiis 5–10 cm. longis; stipulis obovato-ellipticis, 2.5 cm. longis, vix 1.5 cm. latis, basim versus consperse hirtellis; foliis suborbicularibus vel late ellipticis, (10 × 9.5 cm.) usque 24–34 cm. longis et 23–25 cm. latis, basi rotundatis vel interdum obtusis breviter decurrentibus, apice rotundatis vel obtusis vel inconspicue breviter acuminatis, acumine [si adsit] vix 5 mm. longo latoque, valde chartaceis vel subcoriaceis, supra glabris, subtus novellis lamina consperse, costa nervisque densius puberulo-hirtellis, maturis costa nervisque tantum consperse puberulo-hirtellis, nervis primariis utrinsecus 8–10 supra distinctis, subtus perspicuis, oblique patentibus prope marginem arcuatim conjunctis, venis clathratis, venulis inconspicuis; petiolo 1.5–6 cm. longo, glabro; capitulis florentibus non visis, fructiferis 2.5–3 cm. diametro; pedunculis 3.5–5 cm. longis glabris compressis angulatis; bracteis 3–5 mm. sub apice non visis; calycis loborum partibus deciduis 4.5–5 mm. longis fusiformibus, parte inferiore adpresse sericeo-pubescente apice (circiter 1 mm.) obtuse acuminata brunnescente, partibus persistentibus 1.5 mm. longis pubescentibus; coccis 6 mm. longis, receptaculo hirsuto.

NETHERLANDS NEW GUINEA: 2 km. southwest of Bernhard Camp, Idenburg River, *Brass & Versteegh 13509* (TYPE), March 1939, alt. 700 m., frequent in primary forest on slopes (tree 22 m. high; bark brown, scaly; fruit green-brown).

This species appears to be nearest to *Neonauclea cyclophylla* (Miq.) Merr., according to the description, but the fruiting heads are smaller in the New Guinea material, and the leaves are of somewhat different shape.

Neonauclea perspicuinervia sp. nov.

Arbor 20–25 m. alta; ramulis cinereo-brunnescentibus glabris; inter-

nodiis superioribus 1.5–2 cm. longis; stipulis glabris ellipticis, 1.5 cm. longis, 0.9 cm. latis; foliis subcoriaceis glabris late ellipticis, (9–) 18–38 cm. longis, (7.5–) 13–22 cm. latis, basi rotundatis vel obtusis deinde brevissime cuneatis vel leviter decurrentibus, apice obtusis et abrupte acuminatis, acumine 5–9 mm. longo, 3–5 mm. lato, obtuso, venis primariis utrinsecus 9–11 utrinque perspicuis, subtus in axillis domatia ferentibus, patentibus adscendentibus prope marginem arcuatis, venis clathratis utrinque manifestis, reticulo manifesto; petiolo 2–4.5 cm. longo glabro; capitulis immaturis 3.5 cm. diametro; pedunculo 2.5–3 cm. longo, bracteis sub apice non visis; calycis loborum partibus deciduis 7–8 mm. longis, elongato-cuneato-clavatis, apice obtusis cum acumine, villosulis, versus acumen pilis brevissimis, partibus persistentibus subadpresse villosulis; corolla glabra 1.5 cm. longa tubulato-infundibulari, lobis ellipticis obtusis 2 mm. longis; antheris in fauce, oblongis obtusis; stylo 2.5 cm. longo.

NETHERLANDS NEW GUINEA: Patema, 40 km. from Nabire, *Kanehira & Hatusima* 12387 (TYPE), March 1940, alt. 300 m., rain-forest (common tree 20 m. high); Bernhard Camp, Idenburg River, *Brass & Versteegh* 13557, April 1939, alt. 300 m., frequent in rain-forest of slopes (tree 25 m. high, with thick grey scaly bark; wood yellow-brown; flower-buds green).

Neonauclea perspicuinervia is probably related to *N. Hagenii* Lauterb. & K. Schum. but differs from the latter in its larger leaves, oblong-elliptic obtuse stipules, and the different shape of the calyx-appendages. The peduncle has two scars, one just under the head, and one near the middle of the peduncle.

Neonauclea cardiophylla sp. nov.

Ramuli novelli ± hirtelli complanati; internodiis 6–9 cm. longis sub nodis dense hirtellis; stipulis non visis; foliis cordiformibus vel late ovatis basi subcordatis apice abrupte acuminatis, 20–22 cm. longis, 18–20 cm. latis, acumine circiter 1.5 cm. longo obtuso, supra glabris, subtus lamina conperse costa venisque dense pilosulis, pilis ± patentibus vel subadpressis, nervis primariis utrinsecus circiter 9 supra obviis subtus prominulis, venis clathratis manifestis, reticulo inconspicuo; petiolo 3–4 cm. longo glabrato; foliis inflorescentiam subtendentibus 3.5–6 cm. longis 2–3 cm. latis ovatis basi decurrentibus apice acutiusculis, petiolo brevissimo; inflorescentiis terminalibus; pedunculo 2–5 cm. longo; bracteis sub apice cito caducis; capitulis immaturis 2.5 cm. diametro; calycis loborum partibus deciduis 4 mm. longis clavatis apice subtruncatis dense sericeo-pilosulis, pilis adpressis, partibus persistentibus adpresse pilosulis; corolla glabra (alabastro tantum viso); ovario glabro.

SOLOMON ISLANDS: Bougainville: *Waterhouse* 24 (TYPE), April 1932.

In the characters of the flower-head perhaps nearest to *Neonauclea perspicuinervia* Merr. & Perry, but the species is readily distinguished from the latter by the cordate leaves with pubescent lower surface. The leaves subtending the inflorescence are much smaller than the foliar ones and are regarded by some authors as bracts; they are distinctly foliar in character but somewhat different in shape from the larger ones.

Uncaria Schreber

Uncaria bernaysioides sp. nov.

Frutex scandens (?), magnus; ramulis argute tetragonis fere alatis,

novellis parce pubescentibus; foliis ellipticis, 10–13 cm. longis, 4.5–7 cm. latis, basi rotundatis, apice acuminatis, acumine obtuso 8–10 mm. longo, supra glabris subtus nervis venisque parce inconspicue pubescentibus in axillis barbatulis; nervis primariis utrinsecus 8–10 oblique adscendentibus marginem versus arcuatis, supra impressis subtus perspicuis, venis supra subobscuris subtus prominulis, venulis fere obscuris; petiolo \pm 7 mm. longo parce pubescente vel glabro; stipulis persistentibus reflexis rotundatis bilobatis, circiter 1 cm. longis, glabris; uncis non visis; pedunculo 3–4.5 cm. longo, infra articulationem compresso parce pubescente (2.5–3 cm. longo), supra subtereti (1 cm. longo) dense pubescente; bracteis 2–3-lobatis vel 2–3-fidis, glabris vel parce pubescentibus; receptaculo subgloboso, 3–4 mm. diametro, villosulo; capitulo, stylis non inclusis, \pm 5 cm. diametro; floribus pedicellatis; pedicellis 5 mm. et ovario oblongo-clavato 3 mm. longis, dense pilosulis; calyce sericeo-pubescente, tubo 2 mm. longo, lobis 3.5–4 mm. longis, lineari-oblongis crassiusculis, apice truncatis; corolla extus pubescente, tubo circiter 10 mm. longo versus apicem paullo dilatato, lobis 3 mm. longis, 1.5 mm. latis, apice rotundatis; antheris 2.5 mm. longis; stylo 2.3–2.5 cm. longo, stigmate breviter clavato, 2 mm. longo.

NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, *Brass 13602* (TYPE), March 1939, alt. 850 m., common in seral rain-forest on banks of river (large scrambling shrub; flowers pale yellow).

This species strongly resembles *Uncaria Bernaysii* F. v. Muell. as represented in the collections by *Brass 7439*, one of the chief components of seral shrubberies on river-banks (large scrambling shrub; flowers yellow-brown) at Oroville Camp, Fly River (30 miles above D'Albertis Junction). The two differ in the following: von Mueller's species is glabrous, with larger and broader leaves, characterized by inconspicuous venation, and smaller flowers (ovary about 2.5 mm., calyx-tube 1.5 mm., lobes 2.5–3 mm., corolla \pm 11 mm., style 1.5 cm. with narrowly elongate-clavate stigma about 3 mm. long).

Uncaria Valetoniana nom. nov.

Uncaria inermis Valeton, Nova Guin. 8: 454. 1911, Bot. Jahrb. 60: 57. 1925, non Willd. (1793).

BRITISH NEW GUINEA: Lake Daviumbu, Middle Fly River, *Brass 7485*, August 1936, abundant in rain-forests (large canopy liane; flower-clusters brown). SOLOMON ISLANDS: San Cristobal: Puepue River, *Brass 2791*, September 1932, riverine rain-forests on lowlands (stiffly branched climber; leaves paler beneath; flower-heads on very stiff peduncles; flowers green).

Type from Netherlands New Guinea; reported also from Northeastern New Guinea. Valeton's specific name is invalidated by the earlier one of Willdenow.

Uncaria sterrophylla sp. nov.

Frutex scandens(?) magnus; ramulis argute tetragonis glabris in sicco castaneis; foliis ovato-ellipticis, 5–8 cm. longis, 3.3–5 cm. latis, basi obtusis vel rotundatis, apice acuminatis, acumine \pm 1 cm. longo obtuso, coriaceis, supra subnitidis, utrinque glabris, subtus in axillis barbatulis, nervis primariis utrinsecus 5 vel 6 patenti-adscendentibus marginem versus arcuatis, venis subobscuris, venulis sub lente dense reticulatis; petiolo \pm 5 mm. longo glabro; stipulis caducis bifidis rotundatis vel obtusiusculis, circiter

1 cm. longis et 1.5 cm. latis, glabris; uncis gracilibus arcte curvis; pedunculo infra articulationem 1.3–1.7 cm. longo glabro, supra 1 cm. longo dense pubescente; bracteis trifidis; capitulo in fructu \pm 7 cm. diametro; floribus pedicellatis; pedicellis vix 1 cm. (–2 cm. in fructu) et ovario oblongo 3 mm. longis, dense pilosulis; calyce infundibuliformi subsericeo, \pm 3 mm. longo, fere ad medium fissio, lobis oblongis obtusis; corolla (marcida?) 1 cm. longa extus cineraceo-pubescente, lobis circiter 1.5 mm. longis recurvis; antheris in faucis margine obtusis, 1.6 mm. longis; stigmatibus longiuscule exserto anguste clavato; capsulis fusiformibus, \pm 1.3 cm. longis.

NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, *Brass* 11450 (TYPE), November 1938, alt. 2200 m., common in second growth forest on banks of river (large scrambling shrub).

The species suggests *Uncaria avenia* Val. in the tetragonous branchlets, the size of the leaves, and the faint venation; in the latter species, however, the petiole is much longer, the calyx is smaller, and the capsule has a considerably shorter stalk.

Uncaria salomonensis (Rechinger) comb. nov.

Uruparia (Ouruparia) salomonensis Rechinger, Repert. Sp. Nov. 11: 187. 1912, Denkschr. Math.-Naturw. Kais. Akad. Wiss. Wien 89: 607 (repr. 165). t. 6, f. 12b. 1913.

Possibly the material which we describe below as *Uncaria glabrescens* ought to have been placed here, but we have separated them on account of the following characters given in Rechinger's description: branchlets and leaves glabrous; ovary densely white-tomentose; corolla pilose; in addition the flower-heads shown in the illustration are about twice as large as those of *U. glabrescens*. An unusual character in the description is "staminibus tubo fere aequilongis, antheris corolla inclusis." Ordinarily the stamens are scarcely as long as the corolla-lobes and are situated around the margin of the throat.

Uncaria avenia Valetton, Bot. Jahrb. 60: 59. 1925, vel aff.

BRITISH NEW GUINEA: Lake Daviumbu, Middle Fly River, *Brass* 7650, 7915, September 1936, scrambling shrub on floating islands in lake, flowers green.

These collections appear to be nearest to the description of *Uncaria avenia* Val. The branchlets are obtusely tetragonous, and the stipules have already fallen. The leaves are coriaceous rather than membranaceous and glabrous but show minute domatia in the angles formed by the larger veins. Hooks too are present, the upper ones being much shorter than those lower on the branchlets.

Uncaria philippinensis Elmer, Leaf. Philip. Bot. 1: 38. 1906; Merr. Enum. Philip. Fl. Pl. 3: 510. 1923.

SOLOMON ISLANDS: Malaita: Quoimonapu, *Kajewski* 2335, December 1930, rain-forest at sea level (vine); Guadalcanal: Mamassa, Konga, *Kajewski* 2475, February 1931, alt. 400 m., vine in rain-forest. Philippine Islands.

Uncaria glabrescens sp. nov.

Frutex scandens; ramulis obtuse angulatis consperse pilosis vel glabratibus in sicco castaneis; foliis ovato-ellipticis, 6.5–9 cm. longis, 2.5–5 cm. latis, basi obtusis vel subrotundatis, apice acuminatis, acumine circiter 1 cm. longo, supra costa consperse pilosa ceterum glabris, subtus costa nervisque

\pm pilosis, in axillis nervorum barbatulis, nervis primariis utrinsecus 6 vel 7 oblique adscendentibus versus marginem leviter arcuatis, venis supra obscuris, subtus manifestis, reticulo compacto inconspicuo; petiolo 5–8 mm. longo \pm pilosulo; stipulis cito caducis (non visis); uncis gracilibus brevibus leviter curvis; pedunculo infra articulationem 1–2 cm. longo pilosulo, supra 5 mm. longo dense pilosulo; bracteis trifidis glabratis; capitulo post anthesin circiter 1 cm. diametro; floribus pedicellatis; pedicellis vix 2 mm. et ovario 1 mm. longis, sparsim pilosulis, calyce glabro obconico \pm 2 mm. longo, ad medium fisso, lobis oblongis acutiusculis; corolla 1 cm. longa glabra, lobis 1.5 mm. longis recurvis; antheris in faucis margine, 1.2 mm. longis; stigmatibus longiuscule exserto clavato; stylo \pm 15 mm. longo.

SOLOMON ISLANDS: Bougainville: Siwai, *Waterhouse 140* (TYPE), November 1932 (trailing shrub).

This species reminds one of *Uncaria philippinensis* Elmer, but in the latter the peduncles are much longer, the calyx-lobes are persistently pubescent, and the corolla has somewhat broader lobes.

Mussaenda Linnaeus

Mussaenda cylindrocarpa Burck, Ann. Bot. Jard. Buitenz. 3: 118. t. 17. 1883; Valeton, Nova Guin. 8: 456. 1911, op. cit. 14: 259. 1925, Bot. Jahrb. 60: 61. 1925.

NETHERLANDS NEW GUINEA: Hollandia, *Brass 8901A*, June 1938, alt. 10 m., occasional on gravel-beds in river; Bernhard Camp, Idenburg River, *Brass 13272*, March 1939, alt. 850 m., occasional on sandy river-banks. BRITISH NEW GUINEA: Fly River, 528-mile Camp, *Brass 6733*, May 1936, soft-wooded shrub in rain-forest second growths; Palmer River, 2 miles below junction Black River, *Brass 7346*, July 1936, alt. 100 m., semi-shade on slopes of eroding clay banks of river (spreading shrub 1 m. high; flowers yellow; enlarged calyx-lobe white; fruit smooth, cylindrical).

As Valeton has already indicated, this species is exceedingly variable as to leaf-size and pubescence. In the Fly River material the leaves are 9–19 cm. long, 2.5–5 cm. broad, and almost caudate-acuminate, but the inflorescence does not differ essentially from that which is characteristic of the collections from Northeastern New Guinea and the Solomon Islands.

Mussaenda ornata S. Moore, Jour. Bot. 65: 243. 1927, in White, Jour. Arnold Arb. 10: 267. 1929.

BRITISH NEW GUINEA: Fly River, 528-mile Camp, *Brass 6628*, May 1936, alt. 80 m., climbing shrub in rain-forest second growth.

There are some slight differences between this collection and the isotype of *Mussaenda ornata* S. Moore. All parts of the specimen are a little more pilose-villous than on the isotype; the leaves are oblong or oblong-elliptic, 11–17 \times 4–6 cm., with 10–14 primary nerves on either side of the midrib; the stipules are acuminate; and the calyx is 2 cm. long.

Mussaenda aestuarii K. Schum. in K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Süds. Nachtr. 394. 1905; Valeton, Bot. Jahrb. 60: 65. 1925.

BRITISH NEW GUINEA: Ononge Road, Dieni, *Brass 3896*, April 1933, alt. 500 m., shrub in roadside re-growths (leaves shining, paler above; corolla cream-colored, the lobes yellow inside; enlarged calyx-lobe white); same locality, *Brass 3947*, May 1933, alt. 500 m., common in rain-forests (very large liane; smooth shining pale leaves; inside of corolla-lobes yellow; enlarged calyx-lobe white).

Except for the fact that this plant appears to be dioecious (the first col-

lection ♀, the second ♂), it agrees very well with the two descriptions cited above. The species was described from Northeastern New Guinea, and previously has been known only from the original collection.

Mussaenda oreadum Wernh. in Ridl. Trans. Linn. Soc. II. Bot. 9: 70. 1916.

BRITISH NEW GUINEA: Mt. Tafa, *Brass 5040*, September 1933, alt. 2400 m., liane ascending to tops of valley forest trees, not common (branches stiff, erect above, supporting tree-top; leaves shining and nerves impressed above; corolla-lobes bright yellow inside, paler outside and green-veined, the tube pale yellow; enlarged calyx-lobe cream-colored; flower "honeysuckle"-scented).

The leaves are 3–10 × 2–7 cm., in outline ovate-orbicular rather than elliptic or oblong; apart from this feature, the collection corresponds too closely with the description of the above species to place it elsewhere without comparing it with the original from Netherlands New Guinea.

Mussaenda brachygyna sp. nov.

Planta scandens; ramulis novellis minute pubescentibus, lenticellatis; foliis subcoriaceis ellipticis, 3–10 cm. longis, 1.4–5 cm. latis, basi subrotundato-cuneatis, apice subabrupte breviter obtuse acuminatis, acumine vix 5 mm. longo, supra glabris vel costa minute pubescente, subtus costa nervisque adpresse sparsim pubescentibus, nervis lateralibus utrinsecus ± 8 arcuato-adscendentibus, supra impressis subtus conspicuis, reticulo supra impresso, subtus distincto; petiolo 0.7–2 cm. longo, minute pubescente; stipulis 3 mm. longis, lanceolatis acuminatis, apice bifidis; inflorescentiis terminalibus cymosis laxifloris breviter pedunculatis, ramulis brevibus; floribus pedicellatis, pedicellis et ovario brevissimo vix 4 mm. longis adpresse pubescentibus; calycis lobis lineari-lanceolatis, ± 4 mm. longis, sparsim pubescentibus, sepalo phyllomorpha 0.6–1 cm. petiolato, orbiculari-ovato, obtusiusculo, 3–4.5 cm. longo, 2–4 cm. lato, subtus nervis pubescente; corollae tubo 4–4.5 cm. longo basim versus sparsim superne densius adpresse pubescente, fauce paullo dilatato tubuloso, 9 mm. longo, intus hirsuto, lobis oblongis subtus pubescentibus, supra papillatis, 9 mm. longis, acutiusculis; antheris 7 mm. longis, apice circiter 2 mm. infra faucis marginem; stylo 9 mm. longo, glabro, apice bifido; fructibus ellipsoideis lenticellatis, ± 2 cm. longis, 1–1.3 cm. diametro.

BRITISH NEW GUINEA: Fly River, 528-mile Camp, *Brass 6590* (TYPE), 6756, May 1936, alt. 80 m. (large canopy liane; upper surface of leaves shining; flowers orange-yellow); Lake Daviumbu, Middle Fly River, *Brass 7500*, August 1936 (large scandent shrub ascending to tops of lesser canopy trees).

This species ought to be compared with the very fragmentary type of *Mussaenda Bevanii* F. v. Muell. The latter consists of a single stunted leaf and an inflorescence, and no measurements were given in the original description. Since the magnification of the figures of the plate are also indefinite, it is difficult to suit either the description or the plate to specimens. Our species differs from the figures of the plate in the relative proportion of the corolla-tube and lobes; also the ovary is so short and inconspicuous as to suggest that the flowers are only staminate, but a dissection shows them to be perfect.

Mussaenda Ridleyana Wernh. Trans. Linn. Soc. II. Bot. 9: 70. 1916; Val. Nova Guin. Bot. 14: 261. 1925.

NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, Idenburg River,

Brass 12877, February 1939, alt. 1200 m., very common and conspicuous rain-forest canopy liane; 4 km. southwest of Bernhard Camp, Idenburg River, *Brass* 13065, March 1939, alt. 850 m., common along river-banks (large scrambling shrub).

In these collections the primary veins are ascending; the calyx-lobes vary in length (3–6 mm.), and the corolla-lobes are a little shorter (6 mm.) than in the original description, tending to be ovate-lanceolate rather than oblong.

***Mussaenda Kajewskii* sp. nov.**

Frutex 5–6 m. altus; ramulis novellis hirtellis deinde glabratis pallide brunneis; foliis chartaceis ellipticis, (6–) 10–18 cm. longis, (3–) 5–7 cm. latis, utrinque angustatis, apice acuminatis, basi anguste cuneatis, supra consperse pilosulis (pilis brevibus), costa nervisque hirtellis, subtus consperse (costa et nervis et venis dense) hirtellis, nervis lateralibus utrinsecus 7–12 oblique adscendentibus, supra inconspicuis, subtus prominulis, venis subtus manifestis, reticulo obscuro; petiolo (1–) 1.5–3.5 cm. longo, dense hirtello; stipulis cito caducis (non visis); inflorescentiis cymosis amplis, 5 cm. longis, 12 cm. latis, ramis divaricatis, ramis et ramulis et pedicellis hirtellis; pedicellis 2–3 mm. longis; sepalis lineari-lanceolatis, 2–2.4 mm. longis, utrinque hirtellis, sepalo phyllomorpha orbiculari-ovato, circiter 3.5 cm. longo, 2.5–3 cm. lato, obtuso, supra puberulo, subtus pilosulo; corollae tubo 2.5 cm. longo, \pm crispe pubescente, fauce 8 mm. longa intus hirtella; lobis late ovatis, 4 mm. longis, apiculatis, supra dense papillatis, subtus dense pubescentibus (subhirtellis); antheris 5.5 mm. longis; stylo fere 2.5 cm. longo, glabro; ovario 3 mm. longo, hirtello; fructibus ovalibus, circiter 1.3 cm. longis, 0.8–1 cm. diametro, glabratis copiose lenticellatis.

SOLOMON ISLANDS: Guadalcanal: Berande, *Kajewski* 2455 (TYPE), January 1931, rain-forest, common (shrub up to 5–6 m. tall; flowers with cream-colored petals and petaloid sepal; fruit brown when ripe, covered with corky pustules, 1.1 cm. \times 1 cm.).

The species is perhaps nearest to *Mussaenda philippica* A. Rich. but may be distinguished by the more obtuse inconspicuously apiculate flower-buds, the shaggier pubescence, the obscure reticulation of the leaves, and the somewhat smaller fruits.

***Mussaenda philippica* A. Rich.** Mém. Soc. Hist. Nat. Paris 5: 245. 1834; Merr. Enum. Philip. Fl. Pl. 3: 519. 1923.

SOLOMON ISLANDS: Bougainville: Kupei Gold Field, *Kajewski* 1666, April 1930, alt. 100 m., rain-forest (vine; fruit green, oblong, 1.6 cm. \times 0.9 cm.); Ysabel: Meringe, *Brass* 3538, December 1932, alt. 200 m., rain-forest clearings (common large rambling shrub); Owa Riki: without further locality, *Brass* 3075, October 1932, common; rain-forest regrowths (large straggling shrub; flower velvety brown).

These collections do not seem to vary greatly from the Philippine material.

***Mussaenda ovata* sp. nov.**

Planta 3 m. alta; ramulis brunnescentibus hirtellis vel subtomentosis; foliis anisophyllis, majoribus 8–15 cm. longis, 4.5–10.5 cm. latis, minoribus 2–11 cm. longis, 1.5–6 cm. latis, ovatis vel ovato-ellipticis, apice acuminatis, acumine 0.7–1 cm. longo, basi rotundatis vel rotundatis deinde breviter cuneatis, supra sparsim (costa nervisque densius) pubescentibus, subtus sparsim (costa, nervis et venis dense) hirtellis, nervis lateralibus utrinsecus 7–10 patentibus prope marginem arcuatis, supra

distinctis, subtus subprominulis, venis manifestis, reticulo laxo inconspicuo; petiolo 1-4.5 cm. longo subtomentoso; stipulis 8 mm. longis utrinque adpresse hirtellis, acuminatis; inflorescentiis terminalibus laxis sessilibus ramosis; ramulis et pedicellis hirtello-tomentosis; calycis lobis subulatis breviter hirtellis \pm 7 mm. longis, sepalo phyllomorpha 5 cm. longo, lanceolato, 1 cm. petiolato; corollae tubo 5-6 cm. longo adpresse pubescente, intus supra medium hirtello, lobis ovatis apiculatis 1 cm. longis, supra papillatis, subtus adpresse pubescentibus; antheris 1 cm. longis, in medio tubo insertis; stylo 5 cm. longo supra antheris leviter dilatato complanato bifido; ovario 8 mm. longo hirtello subcylindrico; fructibus immaturis obovoideis, 1.7 cm. longis, 0.8 cm. diametro.

NORTHEASTERN NEW GUINEA: Nabire, *Kanehira* & *Hatusima* 11620 (TYPE), February 1940, alt. 20 m., margin of rain-forest (3 m. high; flowers yellow).

Mussaenda ovata superficially suggests some likeness to *M. Kanehirae*, but the fruit is not cylindrical, the anthers are attached in the middle of the corolla-tube, and the corolla-lobes are only apiculate rather than caudate-acuminate.

Mussaenda Kanehirae sp. nov.

Ramuli novelli hirtelli lenticellati brunnescentes vel viridescentes; foliis ellipticis, 15-20 cm. longis, 7-10 cm. latis, utrinque angustatis, apice acuminatis, acumine 1-1.5 cm. longo, basi cuneatis, supra viridescentibus, costa sparsim pubescente, subtus cinerascens, costa et nervis et venis molliter hirtellis, nervis lateralibus utrinsecus 9 vel 10 supra manifestis, subtus distinctis non prominulis, venis supra inconspicuis subtus manifestis, reticulo subobscuris; petiolo 0.8-5 cm. longo, dense hirtello; stipulis 6-8 mm. longis, anguste triangularibus, acuminatis apice bifidis utrinque adpresse hirsutis; inflorescentiis terminalibus cymoso-paniculatis pedunculatis; axi, ramulis et pedicellis hirtellis; pedicellis 1-2 (-4 in fructu) mm. longis; calycis lobis subulatis 2-3 mm. longis sparsim hirtellis, sepalo phyllomorpha 1.5-2.5 cm. petiolato, elliptico, 3.5-5 cm. longo, 3-4 cm. lato, utrinque angustato, apice acuminato, supra glabrato subtus costa nervisque breviter hirtello; corollae tubo extus breviter hirtello 4-4.5 cm. longo, versus apicem dilatato (11 mm.) intus hirsuto deorsum glabro, lobis ovatis, 8 mm. longis, apice caudato-acuminatis; antheris 7 mm. longis; stylo glabro apice bifido, 4.5 cm. longo; ovario cylindrico, dense hirtello; fructibus cylindricis, apice leviter constrictis, 3 cm. longis, 5 mm. diametro, glabratis lenticellatis; calycis lobis deciduis.

NORTHEASTERN NEW GUINEA: Salamaua, *Kanehira* 4011 (TYPE), February 1937, on beach.

The flowers of *Mussaenda Kanehirae* suggest those of *M. pluvialis* S. Moore both in size and in the caudate-acuminate corolla-lobes, but the inflorescence of the latter is much more open, and the two differ in the type of pubescence present. In the former the hairs are spreading and somewhat softer than in the latter, where they are appressed and directed forward. The petioles of pairs of leaves are unequal, and possibly the leaves would also be anisophyllous if the pairs were available.

Mussaenda malacotricha sp. nov.

Planta scandens; ramulis retrorse ferrugineo-hirsutis; foliis chartaceis ovato-ellipticis, 11-16 cm. longis, 5-8 cm. latis, basi rotundatis, apice acuminatis, acumine 1-1.5 cm. longo, supra olivaceis conperse (costa

dense) hirtellis, subtus cinereis molliter subtomentosis vel crispe (costa nervisque dense) hirtellis, nervis primariis utrinsecus 10–14 patentibus versus marginem arcuatim adscendentibus, supra manifestis subtus prominulis, venis utrinque inconspicuis; petiolo 1–1.5 cm. longo ferrugineo-hirtello; stipulis caducis dense hirtellis ?bipartitis; inflorescentiis sessilibus amplis, ramulis patentibus 5–8 cm. longis, ramulis, pedicellis, ovario et calycis lobis dense breviter piloso-hirtellis; pedicellis 2 mm. longis; calycis lobis subulatis, 5 mm. longis, sepalo phyllomorpha magno, 14–15 cm. longo, 8–10 cm. lato, elliptico, apice acuto vel acuminato, basi subrotundato, 1.5–2 cm. petiolato, supra sparsim subtus densius molliter hirtello vel pilosulo; corolla immatura subadpresse hirtella, tubo versus apicem leviter dilatato, apice late ovato obtuso; ovario 5 mm. longo elongato-obconico.

NORTHEASTERN NEW GUINEA: Nabire, *Kanehira & Hatusima 11629* (TYPE), February 1940, alt. 100 m.

The collection most closely approaches the description of *Mussaenda chrysotricha* Val. It differs in the rounded base and the cinereous lower surface of the leaves; the flower-buds are immature, the longest corolla-tube being 2 cm. long, but the pubescence on the corolla does not consist of long hairs; the stipules have fallen except at one node, and here they appear to be parted into subulate segments about 5 mm. long.

Mussaenda procera F. M. Bail. Queensl. Agric. Jour. 3: 155 (repr. p. 2). 1898. S. Moore, Proc. Roy. Soc. Queensl. 34: 54. 1922.

BRITISH NEW GUINEA: Rona, Laloki River, *Brass 3571*, March 1933, alt. 450 m., common; on or in shelter of rocks on savanna slopes (bush 1–2 m. high; flowers yellow, petaloid sepal white); Baroka, *Brass 3726*, April 1933, alt. 10 m., common in rain-forests (large rambler or climber; corolla green outside, orange-brown inside); Kanosia, *Carr 11037*, January 1935, sea-level, undergrowth in secondary forest (flowers greenish yellow outside, bright orange inside).

This species has been twice reported for British New Guinea. The description is not wholly satisfactory, but as far as it goes, these collections seem to fit it fairly well except for the much shorter petioles. If the type is extant, the material should be compared with it and a more complete description given from this adequate material.

Mussaenda Whitei S. Moore, Proc. Roy. Soc. Queensl. 34: 54. 1922.

NETHERLANDS NEW GUINEA: Balim River, *Brass 11682*, December 1938, alt. 1600 m., occasional on grassy long deforested slopes (shrub 1 m. high).

The collection is a reasonable match for the original description of the type-collection, from Mafulu, British New Guinea, differing chiefly in having longer stipules (1.2 cm.) and shorter petioles (1–1.5 cm.) and cymes not too openly arranged. One inflorescence appears normal with fairly compact clusters of almost sessile flowers; the other is larger (12 cm. long, 15 cm. broad), and in this the calyx-lobes or sepals, instead of developing normally, have all become petaloid and are of varying size. The immature fruit is glabrate, oblong, 1.8 × 0.7 cm., and lenticellate.

Mycetia Reinwardt

Mycetia javanica (Bl.) Reinwardt ex Korthals, Ned. Kruidk. Arch. 2(2): 118. 1850; Valetton, Bot. Jahrb. 60: 68. 1925.

Bertiera javanica Blume, Bijdr. 987. 1826.

SOLOMON ISLANDS: Guadalcanal: Uulolo, Tutuve Mt., *Kajewski 2645*, May 1931, alt. 1200 m., on land-slides (shrub 2-3 m. high); San Cristobal: Balego-Nagonago, *Brass 2694*, August 1932, alt. 350 m., rain-forest floor, not plentiful (low shrub 0.5-1 m. high; stem very pale grey; leaves grey above, green beneath; fruit white, very fleshy). Java to the Philippines and New Guinea.

Maschalodesme Lauterbach & K. Schumann

Maschalodesme simplex sp. nov.

Arbuscula 1.5-2 m. alta non ramosa; trunco apicem versus subtetragonum 4 mm. crasso glabro; foliis tenuiter coriaceis glabris, novellis breviter conperse pubescentibus, subsessilibus obovato-oblongis, 26-42 cm. longis, 8-13.5 cm. latis, apice longiuscule acuminatis, in tertio infero gradatim angustatis, basi rotundatis, nervis primariis utrinsecus 16-20, utrinque perspicuis, venis subclathratis utrinque manifestis; petiolo 3-5 mm. longo; stipulis 2 cm. longis ovatis; inflorescentibus axillaribus dense congestis; bracteis 2 cm. longis, ovatis glabris; calyce infundibulari, lobis oblongis acutiusculis, 1-3 mm. longis, extus parce intus dense pubescentibus; corollae tubo 5 mm. longo, fauce pubescente, lobis 2-3 mm. longis, vix 3 mm. latis, obtusiusculis reflexis, in alabastro imbricatis; staminibus 4, circiter 2.5 mm. longis, sessilibus, medio dorso in fauce affixis; ovario in pedicellum 7 mm. longum sensim transeunte; stylo glabro; stigmatibus oblongo-subclavato pubescentibus.

NETHERLANDS NEW GUINEA: 2 km. southwest of Bernhard Camp, Idenburg River, *Brass 13614* (TYPE), March 1939, alt. 700 m., rain-forest undergrowth; Bernhard Camp, Idenburg River, *Brass 13906, 13997*, April 1939, alt. 55 m. and 50 m., in rain-forest occasionally flooded by river. (Unbranched treelet 1-2 m. high; flowers white; fruits red, fleshy).

Maschalodesme simplex differs from *M. arborea* Lauterb. & K. Schum. in the larger leaves with closer and more numerous primary veins (in the original species only 8 or 9). The field note of each number indicates an unbranched treelet.

Lucinaea de Candolle

Lucinaea monantha sp. nov.

Frutex scandens; ramulis subtetragonis novellis dense setuloso-hirtellis deinde glabris; foliis coriaceis glabris, 2-5 cm. longis, 0.8-2.3 cm. latis, lanceolato-ellipticis vel ellipticis utrinque angustatis apice leviter attenuato-acutis, basi obtuse cuneatis, supra nigrescentibus subtus fuscis, costa supra manifestis subtus prominulis, nervis lateralibus subobscuris; petiolo 0.5-1 cm. longo glabro nigro; stipulis caducis vaginantim connatis abrupte acuminatis, \pm 7 mm. longis, fere glabris; floribus solitariis terminalibus in apice ramulorum brevium; pedunculis 3-5 mm. longis glabris; involucri cupuliformi integro; floribus 5-meris; calyce campanulato-tubulato subtruncato vel leviter 5-lobato circiter 5 mm. longo glabro; corolla infundibulari, tubo 4 mm. longo, fauce elongato-ampliata basi squamulis 5 dense barbatis subclausa, circiter 1 cm. longa, lobis 4 mm. longis carnosulis apice incrassatis, anguste trigonis; antheris in apice faucis sessilibus semi-exsertis, vix 3 mm. longis; stylo glabro; stigmatibus bilobo dense papilloso.

NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, *Brass 11858* (TYPE), January 1939, alt. 1800 m., common in mossy forest (large scandent epiphytic shrub; solitary white fleshy flowers; fruit fleshy, white).

Lucinaea monantha closely resembles *L. Schlechteri* Val. in habit and *L. acutifolia* Val. in floral characters. Our species differs from the first in having 5-merous rather than 4-merous flowers, and it may be distinguished from the second by the glabrous peduncles, the shorter broader leaves with venation obscure except for the midrib, and the stouter branches. Both of Valeton's species have 2- or 3-flowered heads, whereas in *L. monantha* the heads are 1-flowered, an unusual character in the genus.

Lucinaea Schlechteri Val. Bot. Jahrb. 60: 81. 1925.

An isotype in our herbarium shows more mature flowers than those described in the original publication: heads 2-6-flowered; flowers sessile; calyx campanulate, truncate, 4 mm. long; corolla funnel-shaped, 15 mm. long, the tube \pm 10 mm. long, within above the base 2-3 mm. bearing a ring of hairs, otherwise glabrous; stamens sessile in the throat, the anthers \pm 2.5 mm. long.

Lucinaea Ledermannii Val. Bot. Jahrb. 60: 82. 1925.

NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, Brass 12400, January 1939, alt. 1500 m., common in rather open rain-forest (large climbing shrub; flowers white); 4 km. southwest of Bernhard Camp, Idenburg River, Brass 13612, March 1939, alt. 850 m., occasional in rain-forest (shortly scandent epiphytic shrub; flowers white).

These collections differ from the original description only in having occasionally on the lower surface of the leaves, particularly along the midrib, a rather crisp hairiness. In the latter character suggesting *L. ramiflora* var. *pubinervis* Valeton, the material differs in having the corolla glabrous except for the ring of hairs within near the base.

Randia Linnaeus

Randia Schumanniana nom. nov.

Randia speciosa K. Schumann, Fl. Kaiser Wilhelms Land 130. 1889, non DC. (1830).

Although the specific name *speciosa* may have been valid according to International Rules at the time it was established, according to the present Code it is invalid, and we have renamed the species for K. Schumann, who described it. It is known from several localities in Northeastern New Guinea.

Randia calliantha sp. nov.

Arbuscula 2-3 m. alta gracilis inflorescentiis exceptis glabra; ramulis \pm sulcatis cinerascentibus; foliis coriaceis ellipticis vel lanceolato-ellipticis, 4-10 cm. longis, 2-5 cm. latis, utrinque angustatis, apice obtuse acuminatis, acumine 5-10 mm. longo, basi anguste cuneatis, nervis primariis utrinsecus 4-6 oblique adscendentibus vel patentibus prope marginem inconspicuis arcuatis, subtus in axillis domatia minuta ferentibus, venis subobscuris; petiolo 5-8 mm. longo; stipulis caducis; floribus in apice ramulorum 1-3, pedunculo 2-3 mm. longo, pedicellis circiter 2 mm. longis glabris vel pubescentibus; bracteis oppositis connatis in parte superiore libera cuspidatis, circiter 2 mm. longis; calyce campanulato in lobos infra medium diviso, tubo \pm 5 mm. longo pubescente, lobis 5 lineari-lanceolatis, acutis, versus basim utrinque sparsim pubescentibus, 5-7 mm. longis, 1.5-2 mm. latis; corollae tubo 3-4 cm. longo extus glabro, intus fauce crispe

pilosulo deorsum sensim glabro, lobis 5 lanceolatis obtusis, 2 cm. longis, 6–7 mm. latis, supra prope faucem pubescentibus; antheris 11 mm. longis, apice circiter 4 mm. infra faucis marginem; stylo glabro, stigmatis lobis oblongis rotundatis, 3 mm. longis; ovario 2–3 mm. longo \pm pubescente; fructibus immaturis, 2-loculatis, glabris.

BRITISH NEW GUINEA: Wuroi, Oriomo River, *Brass 5718* (TYPE), January 1934, alt. 10 m., undergrowth in light rain-forest (slender bush 2–3 m. tall; large fragrant white flowers).

This plant has the same general habit of *Randia Cumingiana* Vidal of the Philippines. It differs obviously in having flowers at least twice the size of those of the Philippine species. In Merr. Enum. Philip. Fl. Pl. 3: 527. 1923, the combination *Randia microcarpa* (Bartl.) Merr. is listed as the older name for *Randia Cumingiana* Vidal. This is true, but unfortunately the specific name *microcarpa* was already pre-empted by Mociño & Sessé (1887–1890), and hence the name *R. Cumingiana* Vidal should be retained for the Philippine species.

Randia decora Val. Bot. Jahrb. 60: 90. 1925, Nova Guin. Bot. 14: 266. 1925; vel aff.

BRITISH NEW GUINEA: Dieni, Ononge Road, *Brass 3887*, April 1933, alt. 500 m., bank of a rain-forest stream (slender tree 12 m. tall; large cream-colored flowers).

This species has been reported for both Netherlands New Guinea and Northeastern New Guinea. This specimen is too near the original description to place it elsewhere without a comparison with the type. It should be pointed out, however, that the leaves are 20–38 cm. long, 5–13.5 cm. broad, the inflorescence is about 5- or 6-flowered, branching about 5 mm. above the base of the peduncle then again \pm dichotomously, giving the impression of an irregular cyme rather than a corymb, the pedicels are 1.5–2 cm. long, the calyx is definitely dentate, the teeth being about 1.5 mm. long and broad, the tube of the corolla is glabrous outside, within, the anthers, instead of being partly exerted as in most species, are included, the apiculate apex being about 3 mm. below the margin of the throat, and about in the middle of the tube is a band \pm 5 mm. wide of crisp hairs. Valeton does not tell anything about the inner surface of the corolla tube, although he does mention the hairiness within the tube in *Randia sphaerocarpa* Lauterb. & K. Schum. The latter species differs in the much longer calyx-lobes.

Randia sessilis F. v. Muell. Fragm. Phytogr. Austr. 7: 47. 1869; F. M. Bail. Queensl. Fl. 3: 754. 1900; C. T. White, Contr. Arnold Arb. 4: 98. 1933.

Randia Macarthurii sensu Val. Nova Guin. 8: 466. 1911; non F. v. Muell. (1876).

BRITISH NEW GUINEA: Oriomo River, Dagwa, *Brass 5993*, February 1934, alt. 40 m., creek-bank gallery forest, rare (small tree 4 m. tall; leaves glabrous, shining; rather large white flowers; rufous brown globose fruit \pm 3 cm. diameter); Tarara, Wassi Kussa River, *Brass 8683*, January 1937, common in rain-forest undergrowth (tree 3–5 m.; flowers white; fruit brown, scurfy, up to 4 cm. diameter).

These collections are a very good match for the two Australian specimens under this name in our herbarium, even to the appressed hairs on the inner surface of the calyx-remnants crowning the fruits. They also seem to agree with Valeton's elaborated description of *Randia Macarthurii*, which unfortunately is a misidentification.

Randia Macarthurii F. v. Muell. Notes on Pap. Pl. 1: 68. 1876; Becc. in D'Albertis, Nov. Guin. 2: 397. 1880; F. M. Bail. Queensl. Agric. Jour. 24: 22. 1910.

Randia Versteegii Val. Nova Guin. 8: 466. 1911, op. cit. 14: 266. 1925.

Gardenia Klossii Wernh. in Ridl. Trans. Linn. Soc. II. Bot. 9: 72. 1916.

BRITISH NEW GUINEA: Palmer River, 2 miles below junction Black River, *Brass* 7365, August 1936, alt. 100 m., river banks (attractive small tree with white honeysuckle scented flowers); Fly River, between junctions Alice and Elevata Rivers, *Brass* 7389, river banks (small tree conspicuous on banks; flowers cream-colored; fruit subglobose, \pm 6 cm. long, 5.5 cm. diameter); Lower Fly River, east bank opposite Sturt Island, *Brass* 8011, October 1936, flood plain rain-forests (substage tree 10 m. high; flowers yellow-white, honeysuckle scented).

Through the kindness of Mr. H. W. Jessep, Director of the Melbourne Botanic Gardens, we have received a flower from the type specimen of *Randia Macarthurii* F. v. Muell. This agrees in every way with that of *Brass* 7365. The inflorescence of this plant is branched and is a perfect match for Valetton's description of *R. Versteegii*. The other two collections cited appear to be conspecific. Mostly the inflorescence is fewer-flowered (3-5), but in one instance it is branched near the base much as in *Brass* 7365, which leads us to suspect that the suppression of branches of the inflorescence is due to some influence of habitat rather than an inherent character of the plant. In addition to the somewhat simpler inflorescence, it may be noted that the calyx is slightly longer and the corolla-tube a little shorter than in *Brass* 7365. Possibly the two with simpler inflorescences represent *R. Klossii* (Wernh.) Val., but it is to be noted that none of the measurements given in Wernham's original description are exclusive of those given in *R. Versteegii* Val. to which Wernham says it is related. All three types ought to be compared. With the material at hand, however, we cannot at present see more than one species.

Randia bernhardensis sp. nov.

Arbuscula? glabra, floribus exceptis; ramulis brunnescentibus teretiusculis cortice striato-sulcatis; foliis anguste ellipticis, 12-14.5 cm. longis, 6 cm. latis, basi cuneatis, apice acutiusculis vel breviter acuminatis, nervis lateralibus utrinsecus circiter 8 patenti-adscendentibus utrinque prominulis, venis subobscuris; stipulis lanceolatis caducis; petiolo \pm 2 cm. longo glabro; ramo inflorescentiam ferente brevi oppositifolio; inflorescentiis vix ramosis, bracteis confertis, floribus fasciculatis; pedicellis \pm 5 mm. longis, glabris; calyce campanulato glabro 3 mm. longo, apice 5-crenulato margine ciliolato; corolla (in alabastro tantum visa) 3 cm. longa, tubo extus subtomentoso, 1.8 cm. longo, intus supra medium (1 cm.) dense adpresse villosulo, ceterum glabro; lobis 1.5 cm. longis extus glabris, intus basim versus tomentosis; antheris 8 mm. longis apice apiculatis; stylo glabro, ovario 2-2.5 mm. longo, glabro.

NETHERLANDS NEW GUINEA: Hollandia, Bernhard Camp, *Neth. Ind. For. Service* bb.25725 (TYPE), August 1938, alt. \pm 50 m.

The flowers of *Randia bernhardensis* differ from those of other species of *Randia* which we have examined in the densely hairy inner surface of the upper half of the corolla-tube. The other species with corolla-tubes so densely pubescent outside usually have the lower part within shortly villous

or at least with a ring of hairs near the base. These also have a more obviously branched inflorescence.

Randia dryadum (S. Moore) comb. nov.

Gardenia dryadum S. Moore, Jour. Bot. 65: 246. 1927, Jour. Arnold Arb. 10: 267. 1929.

BRITISH NEW GUINEA: Rona, Laloki River, *Brass* 3679, March 1933, alt. 450 m., rain-forest, rare (small second storey tree with close grey bark; dull pale nerved leaves, yellowish underneath; fruit solitary in axils of leaves, green, covered with pale brown scurfy scales); Auga River at Mafulu, *Brass* 5499, November 1933, alt. 580 m., riverine rain-forest (small tree with white flowers); Lower Fly River, east bank opposite Sturt Island, *Brass* 8016, October 1936, rain-forest (substage tree 10–12 m. high, restricted to low flood plains; flowers cream-colored, corolla-lobes reflexed; fruit grey-brown scurfy, compressed-ovoid, \pm 6.5 cm. long, 6 cm. diameter). SOLOMON ISLANDS: Ula wa : *Brass* 2953, October 1932, swampy rain-forest (shapely tree 4 m. tall; leaves smooth and shining; flower white; fruit nearly globose, 4.5×4 cm., covered with pale brown mealy scurf); Ysa bel : Meringe, *Brass* 3300, December 1932, alt. 100 m., rain-forests on limestone hills (compact small tree; leaves shining, midrib pale; flowers cream-colored; fruit hard, pale brown, scurfy, about 4×3 cm.).

The above-cited specimens all agree in general habit, color of bark, shape of stipules, flowers where seen (some variation exists in the length of the corolla-lobes), and leaf-outline. The leaves were described as emarginate at the apex. In the isotype at hand, practically all the leaf-tips are injured. In some of the other specimens the leaves are obtusish or slightly contracted near the apex, giving the impression of being very shortly and obtusely acuminate, a character more marked in the material cited from the Solomon Islands than in that from New Guinea; also in the Solomon Islands material the corolla-lobes are longer. These scarcely seem to be specific differences. In *Brass* 3679, where the field-note indicates "fruit solitary in the axils," it appears that only one fruit develops from an inflorescence; these fruits are immature but seem to match very well those of *Brass* 8016, which are practically mature. The fruits are unquestionably those of the genus *Randia*. The outer covering of the pericarp is scurfy, the scales of the younger fruit somewhat lighter in color, the seeds, imbedded in pulp, are smoothish, slightly compressed, ovoid or ellipsoid, and about 5 mm. long and 3.5 mm. diameter. The species ought to be compared with *Randia albituba* Val. Bot. Jahrb. 60: 92. 1925, from the Bismarck Archipelago.

Randia Gaudichaudii Val. Not. Syst. 3: 54. 1914.

SOLOMON ISLANDS: Ysa bel : Meringe, *Brass* 3180, November 1932, littoral rain-forests, common (handsome small tree; flower white; fruit smooth, red); N'Gela : Navotana, *Brass* 3239, November 1932, steep foreshores (compact small tree 8 m. tall; leaves smooth and shining [dull when dry]; flower white; fruit red, fleshy); north end of N'Gela, *Brass* 3511, January 1933, alt. 75 m., hill rain-forests (erect trees 10 m. tall; bark thick, uneven brown, yellow when cut; wood hard, yellow; flower white; fruit very small, smooth, red).

These collections appear to fit reasonably well the description of *Randia Gaudichaudii* Val., except the anthers are a centimeter long (in the description 1 mm., probably a typographical error), and the fruit is pisiform rather than pyriform. Valetón's type was from Rawak (on more modern maps Lawak) Island, near the coast of Waigeo.

Randia spicata Val. Nova Guin. Bot. 8: 468. 1911, op. cit. 14: 267. 1925.

BRITISH NEW GUINEA: Kubuna, *Brass* 5574, Nov. 1933, alt. 100 m., forest on low ridges (slender tree of 2nd storey; flowers white; fruit immature); Koitaki, *Carr* 12555, June 1935, alt. about 450 m., forest (tree 6 m. tall; fruit green).

In the material cited above, which we take from the description to be this species, the flowers are more mature than those described in the type. The calyx is 3.5 mm. long, puberulous, 5-dentate, glabrous within except for glands clustered around the sinuses; corolla tube 1.5–2 cm. long, glabrous except for a few occasional hairs between the anthers; anthers 5–6 mm. long, apiculate, about half exserted; style glabrous, stigma-lobes oblong or slightly lanceolate, striate.

Randia uncaria Elmer, Leaf. Philip. Bot. 1: 30. 1906; Merr. Philip. Jour. Sci. 1: Suppl. 130. 1906, Enum. Philip. Fl. Pl. 3: 529. 1923.

BRITISH NEW GUINEA: Lower Fly River, east bank opposite Sturt Island, *Brass* 7988, rain-forest (large canopy liane climbing by paired hooked thorns; flowers white, fragrant). Previously known only from the Philippines.

Randia macromera Lauterb. & K. Schum. in K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 563. 1900; Val. Bot. Jahrb. 60: 90. 1925.

The nomenclatural status of *Randia macromera* Lauterb. & K. Schum. versus *R. megalocarpa* K. Schum., Fl. Kaiser Wilhelms Land 131. 1889, needs reconsideration. In view of the reported loss of the Berlin Herbarium, it would be necessary to examine isotypes if any such are extant. Schumann & Lauterbach reduced *R. megalocarpa* K. Schum. to *R. speciosa* K. Schum., l. c. p. 564. Valetón, on the other hand, placed *R. megalocarpa* K. Schum. in the synonymy of *R. macromera* Lauterb. & K. Schum. citing the former as "nomen tantum." This is hardly the case, as Schumann's explanatory note concerning *Holrrung* 497 is accepted as a description by Professor Rehder, a well known authority on nomenclature. Probably when sufficient flowering and fruiting material of all the species concerned has been collected the nomenclature can be straightened out.

Gardenia Ellis

Gardenia Archboldiana sp. nov.

Arbuscula epiphytica 5–10 m. alta; ramulis subteretibus cortice pallido lenticellato; internodio ultimo hirtello; foliis plerumque anisophyllis coriaceis glabris, 8–24 cm. longis, 4.5–12 cm. latis, ellipticis vel obovato-ellipticis utrinque angustatis, basi cuneatis, apice breviter acuminatis, acumine basi 1–1.5 cm. lato totidemque longo obtusiusculo, nervis primariis utrinsecus 7–10 patentibus prope marginem arcuatis, supra manifestis, subtus perspicuis in axillis domatia ferentibus, reticulo denso manifesto non prominulo; petiolo 0.5–1.5 cm. longo glabro; stipulis 2–3.5 cm. longis, 1–1.5 cm. latis, apice anguste obtusis vel acutiusculis, extus parce hirtellis; floribus in apice ramulorum breviter pedicellatis, pedicellis 5 mm. longis; calyce spathaceo-tubulato, 5.5–7 cm. longo, apice irregulariter breviter \pm 6-fisso, laciniis rotundatis vel subtruncatis marginem versus pilosis; corolla hypocrateriformi, tubo 11–17 cm. longo, 2–3 cm. crasso, prope faucem sensim dilatato, fauce pilosa, lobis subrhomboideo-ovatis, 3 cm. longis, 2 cm. latis, apice emarginatis; antheris \pm 1 cm. longis in apice faucis sessilibus partim

exsertis; ovario 7 mm. longo, hirtello; stylo apice (\pm 2 cm.) hirsuto ceterum glabro; fructu immaturo ellipsoideo 4 cm. longo, 2.5 cm. diametro, apice calyce tubulato 8 cm. longo coronato.

NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, *Brass 13229* (TYPE), common epiphyte in flood-plain rain-forest (tree 5–10 m. high; flowers white, later yellow).

Gardenia Archboldiana probably belongs in the same group with *G. Lamingtonii* F. M. Bail.; however, in the former the leaves are larger and more coriaceous, the calyx-tube, although incised, is truncate rather than oblique at the apex, the corolla-lobes are subrhombic-ovate rather than oblong, and the anthers are partly exserted.

Gardenia Lamingtonii F. M. Bail. Queensl. Agric. Jour. 3(2): 155 (repr. p. 2). 1898; Val. Nova Guin. Bot. 14: 268. 1925; vel aff.

BRITISH NEW GUINEA: Palmer River, 2 miles below junction Black River, *Brass 7317*, July 1936, alt. 100 m., river flood-plain forest (arborescent hemi-epiphyte growing on tall canopy tree; corolla tube 18–21 cm. long, yellow, later orange; fruit spherical, tuberculate, yellow, 4–4.3 cm. diameter). NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, Idenburg River, *Brass 12918*, February 1939, rain-forest (substage tree 12 m. high; fruit orange-colored).

The collection in flower corresponds reasonably well with Valeton's description of *Gardenia siphonocalyx* except that the anthers are not exserted. On Wernham's verification, he reduced his species to *G. Lamingtonii* F. M. Bail. He does not mention the character of the anthers given in Bailey's original description, "the base produced into a filiform appendage about $\frac{1}{2}$ -in. long," or the "ovary 6-ribbed"; these may be variable characters, or may not be noticeable in dried material (Bailey wrote his descriptions from fresh material he collected on a trip to New Guinea); at any rate neither of these characteristics appears in the specimens above cited.

Gardenia pallens sp. nov.

Frutex vel arbuscula glabra; ramulis teretibus vel obtuse angulatis, cortice pallido lenticellato; foliis plerumque leviter anisophyllis coriaceis, 3.5–11 cm. longis, 2–5.5 cm. latis, ellipticis, basi obtusis vel subrotundatis vel late cuneatis, apice abrupte breviter acuminatis, acumine 0.6–1 cm. longo acutiusculo, nervis primariis utrinsecus 6–9 patentibus prope marginem arcuatis supra distinctis, subtus prominulis in axillis domatia minuta ferentibus, reticulo in foliis novellis laxo, maturis obscuro; petiolo 0.5–1.2 cm. longo; stipulis membranaceis, 1.2–1.8 cm. longis, uno latere connatis (apice verisimiliter emarginatis); floribus in apice ramulorum pedicellatis, pedicellis \pm 5 mm. longis glabris; calyce spathaceo-tubulato, 1.5–2 cm. longo, uno latere ab apice circiter 8 mm. partito emarginato glabro; corolla hypocrateriformi, tubo 5.5–7 cm. longo apicem versus leviter dilatato, fauce glabro, lobis plerumque 6 (5–7), subrhomboideo-ovatis, 1.5–2 cm. longis, 1–1.5 cm. latis, obtusis; antheris 1 cm. longis in apice faucis sessilibus apice exsertis; ovario vix 5 mm. longo glabro, stylo deorsum glabro ad apicem hirtello, stigmatis lobis conglobatis; fructu immaturo ellipsoideo, 3.5 cm. longo, 2 cm. lato, apice calyce tubuloso 2.5 cm. longo coronato.

NETHERLANDS NEW GUINEA: Balim River, *Brass 11614*, December 1938, alt. 1700 m.,

deforested slopes, common on grassy second growths (tree 3 m. high; flowers cream-colored, later yellow); same locality, *Brass 11695* (TYPE), December 1938, alt. 1600 m., occasional in grassy edges of forest (shrub 2 m. high; flowers fragrant, white, later orange).

Gardenia pallens is probably related to *G. Forbesii* Val., if the latter name is to be regarded as validly published; Valetton's binomial appears in the key to the genus, Bot. Jahrb. 60: 99. 1925. This alone would give the name only the status of a *nomen subnudum*, but when one considers the description which Valetton gave of the flower of *Forbes 467* in his original description of *G. siphonocalyx* Val., Nova Guin. 8: 470. 1911, his dissatisfaction of this disposition of the collection, op. cit. 8: 758. 1912, his tentative alliance of the specimen with *G. Gjellerupii* Val., and still later, op. cit. 14: 268. 1925, his expressed opinion that it must be considered as an independent species or subspecies along with *G. Gjellerupii* Val. and *G. Lamingtonii* F. M. Bail., one is inclined to believe that Valetton clearly intended *G. Forbesii* Val. to be represented by the specimen *Forbes 467*. If so, a sufficiently detailed description of the flower was given to establish this as a species. Professor Rehder has suggested that all that is necessary to establish this species without any doubt is the examination of a specimen so labeled by Valetton; this, of course, is impracticable at the present time. *Gardenia pallens* differs from the other species with somewhat spathe-like tubular calyces in the glabrous throat of the corolla and the partly exerted anthers. The fruits are immature, the endocarp appearing only as a very thin crustaceous layer, the seeds are still too small to show any particularly distinctive characters.

Gardenia vernicosa sp. nov.

Arbor 10 m. alta; ramulis glabris, novellis resiniferis, internodiis brevibus (in specimine typico tantum 0.7–1 cm. longis); stipulis coriaceis subpersistentibus ramulos ultimos annulatim vaginantibus; foliis tenuiter coriaceis vernicosis glabris ellipticis, 9–19 cm. longis, 4.5–8 cm. latis, utrinque angustatis, basi cuneatis, apice acuminatis, acumine 0.6–1 cm. longo obtuso, nervis primariis utrinsecus 11–14 patentibus prope marginem abrupte arcuatis utrinque prominulis subtus in axillis domatia minuta ferentibus, venis nervis fere perpendicularibus inconspicue manifestis, reticulo laxo; petiolo 0.8–1.5 cm. longo, resinifero; floribus in axillis superioribus; pedicellis circiter 7 mm. longis glabris; calyce 4-partito; lobis 2 cm. longis, versus basim 3 mm. versus apicem 5 mm. latis, lineari-spathulatis, venosis glabris; corollae tubo 8 cm. longo extus glabro, intus supra medium pubescente, lobis 6 ellipticis, 3 cm. longis, \pm 1.5 cm. latis; antheris 6 linearibus 1.8 cm. longis paullo exertis; stylo \pm 5.5 cm. longo glabro; ovario circiter 6 mm. longo resinoso.

SOLOMON ISLANDS: San Cristobal: Star Harbor, *Brass 3093* (TYPE), October 1932, foreshore hills (densely foliaged tree 10 m. tall; leaves very glossy, paler beneath; corolla-tube green, the lobes white; flowers heavily perfumed).

In general habit this species strongly resembles *Gardenia Storckii* Oliv., but the leaves are larger, and the corolla-tube is about three times as long as the calyx-lobes. It should be noted that here the style is much shorter than the corolla-tube.

Mastixiodendron Melchior

In Jour. Arnold Arb. 23: 416. 1942, we have called attention to the fact that *Mastixiodendron* Melch., established to take care of *Fagraea pachyclados* K. Schum. Fl. Deutsch. Schutzgeb. Südsee Nachtr. 564. 1905, belongs to the Rubiaceae rather than to the Cornaceae, wherein it was originally placed, Bot. Jahrb. 60: 167. 1925. In checking over the unnamed Rubiaceae, we find a collection from Halmahera, *Netherlands Indian Forest Service* bb. 24870, May 1, 1940, which, although in fruit only, appears to be congeneric with the New Guinea collections. Hence the genus is no longer to be considered as endemic in New Guinea.

ARNOLD ARBORETUM,
HARVARD UNIVERSITY.

ADDITIONS TO OUR KNOWLEDGE OF THE FLORA OF
HAINAN¹

HUI-LIN LI

OUR knowledge concerning the flora of Hainan Island is augmented in this paper with the addition of eighteen species and one variety. Twelve of the species and the one variety are proposed as new, the rest being previously described species now first credited to Hainan. Among the new species are five species of *Symplocos* named by Merrill & Chun in connection with their study of the Hainan flora. The genera *Albertisia* and *Lansium* are new to China.

The material used for this study is based on a part of the accumulated collections of Hainan and southern Chinese plants in the herbarium of the Arnold Arboretum, where the types of the new forms herein described are deposited. These collections were made under the auspices of the Botanical Institute of Sun Yatsen University and Lingnan University, with the financial coöperation of the Arnold Arboretum.

PROTEACEAE

Helicia Loureiro

Helicia silvicola W. W. Smith, Notes Bot. Gard. Edinb. 10: 181. 1918.

HAINAN: Kan-en District, Chim Fung Mt., near Sha Mo Kwat Village, *S. K. Lau* 5000, Dec. 13–31, 1934, a shrub, 4 m. high, rare, on dry gentle slopes, in forests, in fruit; Loktung, *S. K. Lau* 27163, June 17, 1936, a shrub, 4 m. high, in dense woods, flowers yellowish white. KWANGTUNG: Shih Wan Tai Shan, Tai Mien Shan, *H. Y. Liang* 69656, July 14, 1937, a shrub or small tree 4–6 m. high, in dense forests. Yunnan; new to Hainan and to Kwangtung.

MENISPERMACEAE

Albertisia Beccari

Albertisia Perryana sp. nov.

Frutex scandens, ramulis ultimis 1.5 mm. diametro, pubescentibus; foliis tenuiter coriaceis petiolatis ovatis vel ovato-ellipticis, 8–14 cm. longis, 2.5–5 cm. latis, acutis vel abrupte acuminatis, basi cuneatis, margine integris, supra subnitidis, in sicco utrinque concoloribus subolivaceis glabris, costa supra vix prominula, nervis lateralibus utrinsecus 3–5, subpatulis, supra subconspicuis, subtus elevatis, prope marginem anastomosantibus, inferioribus angulo-acutiores decurrentibus, ideoque lamina subtrinerviis, venulis supra subconspicuis, subtus distinctis; petiolis 1–2.5 cm. longis, teretibus, in sicco substriatis, utrinque dilatatis; floribus axillaribus, dioicis, floribus ♂ 3–6-fasciculatis, pedunculis ad 5 mm. longis, pubescentibus, pedicellis ad

¹Prepared with partial support of a grant from the Penrose Fund, American Philosophical Society, to Dr. E. D. Merrill to assist him in working up the accumulated collections of Chinese botanical material in the herbarium of the Arnold Arboretum.

3 mm. longis; sepalis extus adpresse pubescentibus, exterioribus 6 minutis inaequalibus bracteiformibus, ad 1.5 mm. longis, interioribus 3 multo majoribus, circiter 8 mm. longis, in pseudocorollam connatis; petalis 6 minutis late obovatis, haud 1 mm. longis, extus pubescentibus, margine integris; staminibus numerosis, in columnam conicam coalitis, 5 mm. longis, antheris subglobosis, horizontaliter insertis bilocularibus transverse dehiscentibus; floribus ♀ ignotis; fructibus axillaribus subsessilibus 2–6 receptaculo insertis divergentibus ellipsoideis, 2.5–3.3 cm. longis, 1.5–2 cm. latis, haud compressis dense tomentellis, endocarpio haud compresso vel leviter latere compresso, leviter scabrido vel levi, exocarpio carnosio, 2–4 mm. crasso, condylis in seminis cavitate nullis, seminibus circiter 2 cm. longis et 1 cm. latis, haud compressis, cotyledonibus subaequalibus, albumine nullo; stylis in fructibus junioribus a basi notatis, filiformibus; pedunculis fructigeris 1–1.5 cm. longis, pubescentibus.

HAINAN: Hung Mo Shan and vicinity, *Tsang & Fung* 691 = *LU* 18225, Aug. 12, 1929, 6 m. high, on mountain tops, in forests; Mo San Leng, *N. K. Chun & C. L. Tso* 44315, Nov. 1932, a woody vine, alt. 3000 ft.; Ch'ang-kiang District, Ka Chik Shan and vicinity, *S. K. Lau* 1618, April 24, 1933, 2937, Dec. 23, 1933, a woody climber, rare, on dry cliffs and gentle slopes, in thickets or forests; without exact locality, *H. Y. Liang* 36737, Oct. 23, 1933, 64748, Jan. 17, 1934, a scandent shrub, open shrubbery or in light woods, twining on trees; Yaichow, *F. C. How* 71040, March–July, 1933, *H. Y. Liang* 62145, July 18, 1933, 62790, Aug. 23, 1933, scandent, twining on trees and shrubs, in shade of mixed forests; Po-ting, *F. C. How* 71852, April 12, 1935, 72792, June 9, 1935, 73303 (TYPE), July 25, 1935, 73721, Sept. 25, *S. K. Lau* 28279, Nov. 30, 1936, twining, in forested ravines, alt. 750–1600 ft.; Bak Sa, *S. K. Lau* 26331, April 19, 1936, scandent, in dense woods; Loktung, *S. K. Lau* 27254, June 25, 1936, scandent, 6 m. high, in dense woods.

The genus *Albertisia*, with its single species *A. papuana* Becc. and its two varieties, was previously known only from New Guinea and the Malay Peninsula. This new species considerably extends the range of the genus and is apparently of wide and not too rare occurrence in Hainan. Among the specimens enumerated, *How* 71852 and *Lau* 1618 and 26331 are male plants in flower, while the rest are all female plants with fruits of varying stages of development. No female flowers are yet available. The Hainan plants agree closely with the characters of the genus except that in the male flowers there are six petals, more or less broadly ovate, entire-margined, and pubescent without; while in the type species of the genus there are only three petals, triangular in shape, glabrous and with crenate-lobulate margins. Only one New Guinean collection is available for comparison, and that has fruits and female flowers only. It agrees closely with the Hainan plants in general habit and other characters, and it is safe to conclude that the two species are congeneric.

In the shape and venation of the leaves, the Hainan plants manifestly resemble the Papuan species, except that in the former the leaves are much smaller, and the acumen of the leaves and the petioles are shorter. In addition to the characters mentioned above, *A. papuana* differs from the Hainan species in the fruits as well as the seeds being generally larger, more laterally compressed, the endocarps being thicker, and the cotyledons more unequal.

This new species is dedicated to Dr. L. M. Perry, who has painstakingly

helped the author to dissect and study the plant thoroughly and to compare it with the Papuan material and previously published data.

ROSACEAE

Photinia Lindley

Photinia Benthamiana Hance var. *obovata* var. nov.

A typo speciei recedit foliis plus minusve oblongo-obovatis, 6–8 cm. longis, 3–4 cm. latis, late acutis vel subrotundatis, floribus plus minusve confertis.

HAINAN: Ling Shui, *F. C. How* 73904 (TYPE), Oct. 20, 1935, a tree 12 m. high, in thickets, alt. 3000 ft.

MELIACEAE

Lansium Jack

Lansium dubium Merr. Govt. Lab. Publ. [Philip.] 17: 23. 1904.

HAINAN: Bak Sa, *S. K. Lau* 25411, Feb. 23, 1936, a shrub along streams, fruits yellow, 25472, Feb. 27, 1936, a tree in woods, fruits reddish yellow. Philippine Islands.

The genus *Lansium* has previously been unrecorded from China. These Hainan specimens are in fruit and they closely match specimens representing *Lansium dubium* Merr., a species of fairly wide distribution in the Philippines, especially with regard to the leaflets with the fine reticulations distinct on both surfaces. The Hainan plants have fruits somewhat ovoid in shape, while those of the Philippine specimens are more or less globose.

STERCULIACEAE

Reevesia Lindley

Reevesia lancifolia sp. nov.

Arbor 10–12 m. alta, ramulis junioribus inflorescentiisque leviter stellato-pubescentibus, ramis glabris teretibus; foliis chartaceis utrinque glabris concoloribusque, pallidis nitidis, oblongo-lanceolatis, 8–12 cm. longis, 1.5–2.5 cm. latis, longe acuminatis, basi acutis, margine integris, costa supra impressa subtus elevata, nervis lateralibus utrinsecus 6 vel 7, gracilibus, utrinque subconspicuis, prope marginem arcuato-anastomosantibus, venis tertiariis inconspicuis; petiolo 1–2.5 cm. longo, glabro; cymis terminalibus, conperse breviter stellato-pubescentibus, multifloris, haud pedunculatis, floribus inclusis usque ad 7 cm. longis, pedicellis 6–8 mm. longis; calycis tubo extus conperse breviter stellato-pubescente, 5–6 mm. longo, circiter 4 mm. diametro, lobis oblongo-ovatis acutis 1 mm. longis; petalis ignotis; androgynophoro glabro circiter 2.5 cm. longo, ovario glabro; fructibus longe pedicellatis lignosis, 3.5–4 cm. longis, 2.4–2.8 cm. latis, obovoideo-oblongis, 5-lobatis, apice rotundatis depressis, basi acutis, extus griseo-furfuraceis; pedicellis 2–2.5 cm. longis; seminibus circiter 2.6 cm. longis, alis brunneis circiter 2 cm. longis, basim versus 0.7 cm. latis, oblongis, apice valde obtusis.

HAINAN: Fan Yah, *N. K. Chun & C. L. Tso* 44052, in 1932–33, a tree 10 m. high, in forests; no precise locality, *H. Y. Liang* 64955 (TYPE), Feb. 19, 1934, a tree 12 m. high, in forests on mountain slopes, fruit green.

A species allied to *R. thyrsoidea* Lindl., differing chiefly in the much narrower lanceolate leaves.

THEACEAE

Tutcheria Dunn*Tutcheria ovalifolia* sp. nov.

Arbor 10 m. alta, ramis ramulisque glabris; foliis coriaceis, apice ramulorum confertis, oblongo-obovatis vel obovatis, 3.5–4.5 cm. longis, 1.8–3 cm. latis, rotundatis vel subrotundatis, basi cuneatis, margine deorsum integris vel subintegris, sursum incurvato-serratis, utrinque glabris, in sicco luteo-olivaceis utrinque subconcoloribus, supra subnitidis, nervis lateralibus utrinsecus 6–10 gracilibus supra subconspicuis, subtus distinctis; petiolis crassis, 2–3 mm. longis; floribus ignotis; capsulis solitariis, obovoideis, breviter (2 mm.) pedicellatis, 3-locularibus, 10 mm. longis, 6 mm. latis, adpresse pubescentibus vel glabris, leviter triangularibus, loculicide dehiscentibus, apice subacutis, stylis persistentibus, brevibus; seminibus subellipticis, plano-convexis, 4–5 mm. longis, 2 mm. latis.

HAINAN: Po-ting, *S. K. Lau* 28218 (TYPE), Nov. 16, 1936, a tree 10 m. high, in forests.

This species is characterized by the relatively small obovate rounded leaves, which are more or less densely arranged at the tips of the branches. It is probably near *Tutcheria symplocifolia* Merr. & Metcalf, but it may be distinguished by the smaller, densely crowded, rounded leaves and by its somewhat different fruits, which are, unfortunately, not quite mature.

BEGONIACEAE

Begonia Linnaeus*Begonia peltatifolia* sp. nov. § *Diploclinium*.

Herba acaulis glabra erecta ad 30 cm. alta, rhizomate circiter 6 mm. crasso; foliis chartaceis, longe petiolatis, latissime peltatis, leviter inaequilateraliter ovatis, 10–11 cm. longis, 7.5–8 cm. latis, basi latissime rotundatis, apice abrupte brevissime acuminatis, margine integris, 10–12-nerviis, nervis primariis supra leviter subconspicuis, subtus subconspicuis, reticulis laxis obscuris; petiolo circiter 18 cm. longo; caulibus floriferis efoliatis, 20 cm. longis; infructescentiis cymosis, longe pedunculatis, folia aequantibus vel quam eis longioribus, ramis longioribus ad 6.5 cm. longis, pedicellis 1–2.5 cm. longis, capsulis inaequaliter 3-alatis, circiter 1.6 cm. longis et 2.3 cm. latis, apice truncatis, basi subrotundatis, glabris, alis majoribus 1.5 cm. latis, apice subrotundatis, minoribus 8 mm. latis, rotundatis.

HAINAN: Bak Sa, *S. K. Lau* 27552 (TYPE), July 20, 1936, an herb in dense woods, fruit pale brown.

A very distinct species, characterized by its totally glabrous habit and especially by its entire, only slightly inequilateral, broadly peltate leaves.

STYRACACEAE

Styrax Linnaeus*Styrax suberifolius* Hook. & Arn. Bot. Beechey Voy. 196. t. 40. 1841.

HAINAN: Kumyun, *S. K. Lau* 27607, Aug. 3, 1936, a tree 7 m. high, in dense woods on slopes. Kwangtung to Yunnan; new to Hainan.

SYMPLOCACEAE

Symplocos Jacquin

Symplocos punctato-marginata A. Chev. ex Guillaum., Bull. Soc. Bot. France 79: 174. 1932, Lecomte, Fl. Gén. Indo-Chine 3: 1004. 1933; Merr. Lingnan Sci. Jour. 15: 424. 1936.

HAINAN: Yaichow, *H. Y. Liang* 62253, July 23, 1933, a tree 15 m. or more high, in forested ravines, in dense shade, flowers yellow; Po-ting, *F. C. How* 72873, June 12, 1935, a tree 10 m. high, alt. 2800 ft., flowers greenish white, fragrant. Indo-China, also recorded from Kwangtung proper; new to Hainan.

Symplocos hainanensis Merrill & Chun in herb. sp. nov. Subgen. *Hopea*, § *Bobua*, *Plura*.

Arbor 10–15 m. alta, ramis ramulisque glabris teretibus, atro-brunneis; foliis chartaceis distincte petiolatis glabris oblongo-ellipticis, 8–11 cm. longis, 2.5–4 cm. latis, acuminatis, basi cuneatis, margine crenato-serrulatis, supra nitidis viridibus, subtus pallide viridibus, costa supra leviter impressa subtus valde elevata, nervis lateralibus utrinsecus 7–10 arcuato-anastomosantibus, nervis venulisque utrinque perspicuis; petiolis 0.5–1 cm. longis glabris; inflorescentiis spicatis axillaribus gracilibus, ad 6 cm. longis, junioribus parce pubescentibus, mox glabrescentibus, multifloris; floribus sessilibus vel subsessilibus, bracteis minutis, late ovatis, circiter 1 mm. longis, parce pubescentibus; calycis tubo valde crasso, 1 mm. longo, glabro, lobis 4 vel 5 oblongis, 2 mm. longis, glabris; petalis 4 vel 5 albis ovatis, 4 mm. longis, glabris; staminibus circiter 25–30, filamentis gracilibus glabris, 3–5 mm. longis; ovario 3-loculari; disco annulari glabro; stylo 5 mm. longo, glabro, stigmate capitato; fructibus oblongis, ad 1.5 cm. longis et 0.5 cm. latis, glabris sessilibus vel breviter pedicellatis, pedicellis ad 2 mm. longis, calyce persistente.

HAINAN: Po-ting, *F. C. How* 73130 (TYPE), July 8, 1935, a tree 12 m. high, in forested ravines, alt. 1500 ft., flowers white, slightly fragrant, 73264, July 20, 1935, a tree 15 m. high, in forested ravines, alt. 1400 ft., fruit pale green, 73424, no field notes available; Ling Shui, *F. C. How* 73764, Oct. 10, 1935, a tree 10 m. high, in forests, alt. 1800 ft., flowers white, fruit pale green.

This species is probably nearest *Symplocos lancifolia* Sieb. & Zucc., from which it may be distinguished by being glabrous except for the inflorescences, by the broader leaves, the more slender inflorescences, the white petals, and the oblong, much larger fruits.

Symplocos stenophylla Merrill & Chun in herb. sp. nov. Subgen. *Hopea*, § *Bobua*, *Plura*.

Frutex 2 m. altus, ramis brunneis teretibus, ramulis novellis glabris fulvis plus minusve angularibus; foliis chartaceis vel subcoriaceis subsessilibus vel breviter petiolatis glabris lanceolatis, 8–10 cm. longis, 1.2–1.5 cm. latis, longe acuminatis, basi valde attenuatis, margine serrulatis leviter revolutis, supra viridibus, subtus pallide viridibus, costa supra leviter impressa subtus elevata, nervis lateralibus utrinsecus 5–7 arcuato-adscedentibus prope marginem anastomosantibus, nervis venulisque gracilibus utrinque perspicuis; petiolis ad 5 mm. longis glabris; inflorescentiis spicatis simplicibus axillaribus parce pubescentibus vel glabrescentibus, 6–8 cm. longis, multifloris; floribus sessilibus, bracteis late ovatis, 1 mm. longis, pubescentibus; calycis tubo crasso 5-lobato glabro, lobis late ovatis, 1 mm. longis; petalis

5 oblongis, 5 mm. longis, 3 mm. latis, glabris; staminibus circiter 40, filamentis gracilibus glabris 5–6 mm. longis; ovario 3-loculari; disco annulari glabro; stylo 6 mm. longo glabro, stigmate capitato; fructibus plus minusve conicis, circiter 4 mm. diametro, glabris sessilibus, calyce persistente.

HAINAN: Lokwui, *F. C. How* 72325 (TYPE), May 13, 1935, a shrub 2 m. high, on river banks, flowers white; Po-ting, *F. C. How* 73675, Sept. 15, 1935, a shrub 2 m. high, along streams, alt. 1200 ft., fruit pale green.

A species well characterized by its lanceolate leaves, long spicate inflorescences, and somewhat conical fruits. It is probably most closely related to *Symplocos laurina* Wall.

Symplocos Howii Merrill & Chun in herb. sp. nov. Subgen. *Hopea*, § *Bobua*, *Lodhra*.

Arbor circiter 18 m. alta, ramis teretibus fulvo-nigris, ramulis novellis glabris fulvis plus minusve angularibus; foliis subcoriaceis glabris distincte petiolatis oblongo- vel lanceolato-ellipticis, 7–11 cm. longis, 2–3 cm. latis, longe acuminatis, basi cuneatis, margine integris vel remote serrulatis, supra viridibus nitidis, subtus pallide viridibus, costa utrinque elevata, nervis lateralibus gracilibus utrinsecus 5 vel 6 adscendentibus anastomosantibus utrinque perspicuis, venulis reticulatis utrinque subconspicuis; petiolis circiter 1 cm. longis glabris; inflorescentiis ignotis; infructescentiis axillaribus spicatis, pedunculis circiter 1 cm. longis, minute pubescentibus vel glabris, 2–4-fructigeris; fructibus sessilibus vel subsessilibus ovoideis, 0.8–1 cm. longis, 0.6–0.8 cm. latis, glabris nitidis 3-locularibus; bracteis late ovatis, 1.5–2 mm. longis, calyce persistente.

HAINAN: Po-ting, *F. C. How* 73286 (TYPE), July 23, 1935, a tree 18 m. high, in forests, alt. 1800 ft., fruit lustrous green, 73346, no field notes available.

This species is very near *Symplocos setchuensis* Brand, differing in the leaves being narrower and sometimes serrulate, and in the infructescences being distinctly pedunculate.

Symplocos permicophylla Merrill & Chun in herb. sp. nov. Subgen. *Hopea*, § *Bobua*, *Lodhra*.

Frutex 2 m. altus, ramis teretibus gracilibus brunneo-nigris, ramulis novellis dense brunneo-pubescentibus; foliis perparvis coriaceis breviter petiolatis oblongo-ovatis, 1.5–2.5 cm. longis, 0.5–1 cm. latis, acuminatis, basi valde attenuatis, margine distincte glanduloso-serratis, utrinque glabris, supra viridibus subnitidis, subtus pallide viridibus, costa supra leviter impressa subtus elevata, venis venulisque utrinque obscuris; petiolis 2–3 mm. longis glabris interdum glandulosis; floribus axillaribus plerumque solitariis raro binis sessilibus vel subsessilibus, in ramulis hornotinis ortis, bracteis ovatis, 1.5 mm. longis, brunneo-pubescentibus; calycis tubo valde crasso, circiter 1 mm. longo, dense brunneo-pubescente, lobis 5 oblongis, 1.5 mm. longis, extus parce brunneo-pubescentibus, intus glabris; petalis 5 albis late ovatis rotundatis, 3.5 mm. longis, 2 mm. latis, omnino glabris; staminibus circiter 25–35, filamentis gracilibus glabris circiter 2–3.5 mm. longis, disco annulari indistincto; ovario 3-loculari, stylo 3.5 mm. longo glabro, stigmate capitato; fructibus immaturis oblongis, 6 mm. longis, 2 mm. latis, parce brunneo-pubescentibus, calyce persistente.

HAINAN: Po-ting, *F. C. How* 72900, June 14, 1935, a shrub 2 m. high, in forests, alt. 2400 ft., flowers white, fruit green, pubescent, 72972 (TYPE), June 23, 1935, a shrub 2 m. high, in forests, alt. 2900 ft., flowers white, fruit pale green, with brown pubescence.

A very distinct species, well characterized by its unusually small, coriaceous, sharply glandular-serrate leaves without visible veins and veinlets, and the mostly solitary axillary flowers, produced on the year's new branches.

Symplocos atriolivacea Merrill & Chun in herb. sp. nov. Subgen. *Hopea*, § *Bobua*, *Lodhra*.

Frutex 3–3.5 m. altus, ramis glabris brunneis, ramulis novellis adpresse hirsutis teretibus, brunneis; foliis chartaceis vel submembranaceis breviter petiolatis, in sicco atro-olivaceis utrinque subconcoloribus, in vivo e collectore supra atro-viridibus, subtus viridibus nitidis, oblongo-ovatis, 12–16 cm. longis, 3.5–5.5 cm. latis, acuminatis, basi late acutis, margine indistincte serrulatis, costa supra leviter impressa subtus valde elevata, venis lateralibus gracilibus utrinsecus 10–12 arcuato-anastomosantibus, nervis venulisque utrinque perspicuis; petiolis valde crassis circiter 5 mm. longis, glabris; inflorescentiis axillaribus fasciculatis subsessilibus vel leviter pedunculatis, 3–7-floris, pedunculis 2–3 mm. longis, pubescentibus; floribus sessilibus; bracteis late ovatis, 1.5 mm. longis, pubescentibus; calycis tubo crasso, 1 mm. longo, pubescente, lobis 5 ovatis, 3 mm. longis, extus pubescentibus, intus glabris; staminibus circiter 20, filamentis 2–3 mm. longis; disco protruso pubescente; ovario 3-loculari, stylo glabro 3 mm. longo, stigmate capitato; fructibus sublageniformibus, 1 cm. longis, 6 mm. crassis, pubescentibus, calyce persistente.

HAINAN: Po-ting, *F. C. How* 72938, June 18, 1935, a shrub 3 m. high, in thickets, alt. 2100 ft., fruit green, tomentose, 73262 (TYPE), July 20, 1935, a shrub 3.5 m. high, along trails near ravines, alt. 1300 ft., flowers white, fruit green.

In the olivaceous leaves, the densely pubescent, very short, and spicate inflorescences, and the prominent disk, this species is close to *Symplocos olivacea* Merr. of Tonkin, Indo-China. The two species, which evidently belong to the section *Bobua*, are rather unusual in having the leaves becoming strictly olivaceous when dry, in this character resembling species of the section *Cordyobaste* rather than *Bobua*. This new species can be distinguished from *S. olivacea* Merr. in the thinner, much larger, and more olivaceous leaves and the fewer stamens.

OLEACEAE

Olea Linnaeus

Olea neriifolia sp. nov.

Planta omnino glabra, ramis ramulisque cinereis, parce inconspicue lenticellatis; foliis chartaceis petiolatis lanceolatis, 5–8 cm. longis, 0.8–1 cm. latis, acuminatis, basi longe attenuatis, margine integris leviter revolutis, in sicco olivaceis utrinque concoloribus, costa supra leviter impressa subtus elevata, venis venulisque utrinque obscuris; petiolo crasso, circiter 5 mm. longo; inflorescentiis paniculatis axillaribus, circiter 3.2 cm. longis et 1.6 cm. latis; floribus minutis, pedicellis 1 mm. longis; calycibus 0.5 mm. altis, ad medium 4-lobatis, lobis ovatis acutis submembranaceis; corolla 1.5 mm. longa, ad $\frac{1}{3}$ lobata, lobis acutis; antheris vix 1 mm. longis; ovario ovoideo, stylo brevi, stigmate inconspicuo.

HAINAN: No field data, *S. K. Lau* 28388 (TYPE), in 1936.

A species resembling *O. cuspidata* Wall. but differing in the more lanceo-

late leaves, which are concolorous on both surfaces, as well as in its smaller flowers.

Olea hainanensis sp. nov.

Frutex 3–9 m. altus inflorescentiis exceptis glaber, ramis pallidis, ramulis plerumque brunneis pallide tessellatis; foliis chartaceis petiolatis ovato-oblongis, 10–15.5 cm. longis, 3–5 cm. latis, acuminatis, basi cuneatis, margine remote serratis vel subintegris, in sicco supra olivaceis subtus paullo pallidioribus, costa supra leviter impressa subtus elevata, venis lateralibus utrinsecus 7–9, utrinque subconspicuis, venis tertiariis supra obscuris subtus leviter impressis; petiolo crasso canaliculato ad 1 cm. longo; inflorescentiis paniculatis axillaribus, ad 5 cm. longis et 3 cm. latis, parce pubescentibus vel subglabris; floribus minutis, pedicellis 1 mm. longis; calycibus 0.75 mm. altis, ad medium lobatis, lobis triangularibus, subacutis, margine leviter ciliatis; corolla 1.5 cm. longa, ad $\frac{1}{3}$ lobata, lobis rotundatis; antheris ad 1 mm. longis; ovario rudimentario; floribus perfectis ignotis.

HAINAN: Ling Shui, *F. C. How* 73749 (TYPE), Oct. 7, 1935, a tree 9 m. high, in forests, alt. 1700 ft., flowers greenish; Po-ting, *F. C. How* 73762, Oct. 10, 1935, a large shrub 4 m. high, in forests, alt. 1700 ft., flowers greenish, *S. K. Lau* 27977, Oct. 14, 1936, 28108, Oct. 27, 1936, a shrub 3–4 m. high, in dense woods, flowers pale green.

This species is very close to *O. dentata* Wall., of India, differing in the much shorter inflorescences and smaller flowers.

RUBIACEAE

Gardenia Ellis

Gardenia angkorensis Pitard in Lecomte, Fl. Gén. Indo-Chine 3: 252. 1923.

HAINAN: Kumyun, *S. K. Lau* 27656, Aug. 11, 1936, a shrub 3 m. high, in dense forests, on slopes, fruit green; Yaichow, *H. Y. Liang* 63049, Sept. 13, 1933, a shrub 2 m. high, in shady forests in ravines, fruit green. Indo-China. New to Hainan.

The occurrence of a plant from the southern part of Indo-China in Hainan is noteworthy. Pitard separates the Indo-Chinese plants originally referred by Pierre to a single species, *Gardenia cambodiana* Pierre, according to his manuscript names, into two species, *G. cambodiana* Pierre and *G. angkorensis* Pitard. The differences are that in *Gardenia cambodiana* the sepals are more or less foliaceous and the leaves slightly larger. Only one flowering specimen of *G. cambodiana* is available for study. The Hainan plants closely match the description of *G. angkorensis*. Both the Indo-Chinese and Hainan plants give indications of growing in a somewhat xerophytic habitat, this being revealed by their general appearance. I am not entirely certain that two species should be maintained here as Pitard has proposed.

Psychotria Linnaeus

Psychotria hainanensis sp. nov.

Suffrutex erectus circiter 1 m. altus, omnino glaber, ramulis ultimis circiter 2 mm. diametro; foliis subchartaceis oblongo-ellipticis, 8–14.5 cm. longis, 3.5–6 cm. latis, acuminatis, basi attenuatis, margine integris, supra viridibus, subtus pallidioribus, nervis lateralibus utrinsecus 8–14 adscendentibus prope marginem arcuatis utrinque conspicuis, venulis obscuris; petiolis 1–2 cm. longis; stipulis triangularibus, 8 mm. longis, 5 mm. latis,

apice longe acuminatis, caducis; floribus ignotis; infructescentiis terminalibus sessilibus 2-fructigeris, bracteis lineari-lanceolatis, circiter 7 mm. longis, acuminatis: fructibus glabris pedicellatis ovoideis, circiter 9 mm. longis et 7 mm. crassis, haud sulcatis, calycis lobis lineari-lanceolatis 1.5 mm. longis persistentibus coronatis; pedicellis 4 mm. longis; seminibus plano-convexis haud sulcatis, albumine aequabili.

HAINAN: Po-ting, *F. C. How* 73609 (TYPE), Sept. 3, 1935, 1 m. high, in forests on summits of mountains, alt. 3800 ft., fruit green.

Lasianthus Jack

Lasianthus Chevalieri Pitard in Lecomte, *Fl. Gén. Indo-Chine* 3: 384. *f.* 30, *6.* 1924; Merr. *Jour. Arnold Arb.* 21: 386. 1940.

HAINAN: Kan-en District, Chim Fung Mt., near Fong Ngau Po Village, *S. K. Lau* 5221, Jan. 2-31, 1935, 3 m. high, fairly common, on dry steep slopes, in forests, fruit yellow. Indo-China. New to Hainan.

ARNOLD ARBORETUM,
HARVARD UNIVERSITY.

THE COMPARATIVE MORPHOLOGY OF THE WINTERACEAE IV. ANATOMY OF THE NODE AND VASCULARIZATION OF THE LEAF

I. W. BAILEY AND CHARLOTTE G. NAST

With three plates

NODAL ANATOMY

THERE are three basically different types of foliar nodal anatomy in the dicotyledons (Sinnott, 5), viz. unilacunar, trilacunar, and multilacunar. In the primitive trilacunar type, the strands or bundles of foliar vascular tissue are related at the node to three separate and distinct lacunae or interfascicular parts of the hypothetical, cauline, primary vascular cylinder.¹ In the derived unilacunar type, the strand or strands are related to a single "median" lacuna, whereas in the multilacunar one, the strands or bundles of foliar vascular tissue are related to five, seven, or more lacunae.

The nodal anatomy may be constant throughout a family or it may fluctuate in various ways within it. Many families exhibit a mixture of unilacunar and trilacunar nodes or of trilacunar and multilacunar ones, but comparatively few families have the entire range of all three types of nodes. This is due to the fact that most heterogeneous families show a trend of specialization either of reduction from trilacunar to unilacunar or of amplification from trilacunar to multilacunar. These lines of specialization in the nodal anatomy of dicotyledons are not infrequently closely correlated with specializations in other parts of the plants (Bailey and Howard, 1-4), and therefore they are of considerable significance in any discussion concerning natural subdivisions of families.

The nodal anatomy of the Winteraceae is remarkably stereotyped and constant throughout the family. Three foliar bundles are related, *Figs. 1 and 2*, to three lacunae in the vascular cylinder of the stem, i.e. the node is trilacunar in all representatives of the family. The nodal pattern is constant regardless of extreme variations in the size of the leaf, the length and diameter of the petiole, and the character of the lamina. Leaves of *Drimys microphylla* A. C. Sm. and *D. buxifolia* Ridley, a centimeter or less in length, have a similar nodal structure to those of *Bubbia longifolia* A. C. Sm., which may attain a length of 35 centimeters or more. This is particularly significant, since in other dicotyledons extreme reduction in the

¹Recent investigations in palaeobotany and in the study of the ontogeny and comparative anatomy of the vascular plants render essential revaluations and modifications of various established morphological concepts and concomitant revisions and clarifications of terminologies. Owing to existing contradictions and uncertainties in botanical literature, we shall avoid the use of such terms as dictyostele, trace, gap, etc.

size of the leaf not infrequently leads to a reduction of trilacunar nodes to unilacunar ones, just as excessive enlargement of the leaf may lead to an amplification of trilacunar nodes to pentalacunar or multilacunar ones.

VASCULARIZATION OF THE LEAF

Although the nodal anatomy of the Winteraceae is highly stereotyped and stable, the vascularization of the petiole and lamina of the leaf is variable and rather unstable. Simpler types of foliar vascularization tend to occur in most species of *Drimys* and *Pseudowintera*, complex and more highly specialized ones in certain species of *Bubbia*, *Bellium*, and particularly of *Exospermum* and *Zygogynum*. In the simpler type of vascularization, the three strands of vascular tissue extend outward² through the petiole and for varying distances into the lamina of the leaf, *Figs. 2, 4, and 5*. Sooner or later the lateral ones either diverge laterally or become fused to the median one, which extends outward to the tip of the leaf, *Fig. 6*. In the lower parts of the lamina, the subsidiary veins are detached from the flanks of the lateral strands, *Fig. 4*, whereas in the upper parts of the lamina they branch off from the flanks of the single arc-shaped bundle, *Fig. 6*. In *Drimys* and *Pseudowintera*, there appear to be two trends of specialization of this basic pattern of vascularization. One or more of the strands may divide in the base of the petiole. Such petioles contain 4, 5, or 6 bundles, *Fig. 3*, and in exceptional cases as many as 9 bundles, *Fig. 10*. These bundles may reunite at the base of the lamina, restoring the original number of 3, *Fig. 9*, or they may extend outward for varying distances into the lamina. A second trend of specialization consists of a precocious fusing of the strands to form a more or less conspicuously 3-lobed, arc-shaped bundle, *Fig. 7*, which arises at various levels of the petiole or of the base of the lamina. In certain cases, both types of specialization occur simultaneously, the numerous bundles in the lower part of the petiole fusing to form a more or less continuous arc-shaped strand, *Fig. 8*, in their outward course. The individual bundles vary considerably in size, form, and the amount of cambial activity that occurs within them. The three original strands usually are of comparatively uniform sizes, *Fig. 1*, but the products of their divisions may exhibit markedly different dimensions, *Figs. 3 and 10*. The individual bundles may be broad (tangentially) and shallow (radially), *Fig. 8*, or narrow and deep (due to greater cambial activity), *Fig. 9*.

Although there are a number of distinct patterns of foliar vascularization in *Drimys* and *Pseudowintera*, specific patterns are not stabilized in most cases within species or varieties. Not only do the types of vascularization fluctuate more or less extensively in different collections of the same species or variety, but also in different leaves from the same plant. In the case of the New World (*Wintera*) section of *Drimys*, which we have studied in considerable detail, the range of variability appears to be greater in *Drimys Winteri* varieties *punctata* (Lam.) DC. and *chilensis* (DC.) A. Gray and

²The terminology used is purely descriptive and bears no implications regarding sequences in ontogenetic development, viz. inward or outward development of procambium, xylem, and phloem.

D. granadensis var. *grandiflora* Hieron. than in *D. confertifolia* Phil., *D. Winteri* var. *andina* Reiche, and *D. granadensis* varieties *chiriquiensis* A. C. Sm. and *mexicana* (DC.) A. C. Sm. All of the previously described patterns of foliar vascularization are encountered in leaves from different collections of the first three plants, whereas the more complex types of vascularization have not been found in leaves of the last four. It may be significant, in this connection, that the leaves of the former plants commonly are larger or broader than those of the latter. That the type of vascularization is not determined directly and invariably by the size of the leaf is evidenced, however, by the fact that large leaves may at times have simpler patterns and small leaves complex ones. The length and form of the petiole in relation to the size and form of the lamina are evidently complicating factors in need of future detailed investigation.

In *Drimys* and *Pseudowintera*, division of the three strands to form more than six bundles in the petiole and the base of the lamina is of exceptional occurrence, being confined in the material that we have studied to leaves from certain collections of *Drimys Winteri* varieties *chilensis* and *punctata* and *D. granadensis* var. *grandiflora*. In these specimens there are 7-9 small bundles in the petiole, Fig. 10, which frequently tend to become more or less coherent in the basal part of the lamina, Fig. 8. The bundles have a normal abaxial orientation of phloem and are arranged in a single symmetrical arc. The tendency for the three strands to form five or more bundles in the petiole is intensified in *Belliolum*, *Bubbia*, *Exospermum*, and *Zygogynum*, and the bundles tend to maintain their individuality in the basal parts of the lamina, i.e. the bundles do not fuse into a more or less coherent arc of vascular tissue, except in certain species of *Bubbia*, e.g. *B. pachyantha* A. C. Sm. (Brass 4371).

In *Belliolum*, the more or less numerous bundles of the petiole and midrib, Fig. 12, are of normal form and orientation except that the median bundle may at times be conspicuously offset abaxially from a normal position in the arc of bundles, compare Figs. 10 and 12. Similar types of vascularization occur in *Bubbia*, but in certain cases three bundles are offset abaxially, Fig. 14. The xylem of the offset bundles commonly tends to assume an adaxially indented form as seen in transverse sections. Three of the bundles are offset in the petioles and midrib of *Exospermum Lecarti* v. Tiegh., Fig. 15. The median one commonly exhibits an amphicribal form, Fig. 17, whereas the xylem of the two lateral ones is indented or horseshoe-shaped. The numerous bundles of the slightly concave arc are of varied forms and orientations. The bundles in the petioles and midrib of *E. stipitatum* (Baill.) v. Tiegh., Fig. 11, tend to be associated in pairs that are jacketed in the lamina by sclerenchyma. As shown in Fig. 13, one bundle of each pair has an inverted orientation, i.e. the phloem is situated on the adaxial side of the xylem. Similar aberrant types of bundle structure and bundle orientation occur in *Zygogynum*, Fig. 16.

The patterns of foliar vascularization fluctuate in *Belliolum*, *Bubbia*, *Exospermum*, and *Zygogynum*, not only in different species, but also within different leaves of the same species. Furthermore, the specific topographical

features, visible in transverse sections, vary more or less at different levels of the petiole and midrib. The ranges of structural variability within species and genera are more or less extensive and may or may not overlap. In the past, most investigators have overlooked or ignored such factors of variability in attempting to differentiate species and genera of dicotyledons by their petiolar structure. Thus, van Tieghem (8) infers a greater stability of structural patterns in the Winteraceae than actually occurs. He states that there are seven bundles in the petioles of *Drimys*, *Pseudowintera*,³ *Belliolum*, and *Bubbia*, three bundles from the median strand and four from the two bifurcating lateral ones. Whereas these bundles have a normal orientation of xylem and phloem, van Tieghem maintains that three of the seven bundles in *Exospermum stipitatum* and *E. Lecarti* have an inverted orientation and are associated in pairs with three normal bundles. Furthermore, according to van Tieghem, there are eight bundles in the petiole of *Zygogynum*, one of which is offset. In *Z. Balansae* v. Tiegh., *Z. bicolor* v. Tiegh., *Z. pomiferum* Baill. and *Z. spathulatum* v. Tiegh., none of these eight bundles divides to form paired bundles, whereas in *Z. Vieillardii* Baill. the offset bundle does so, and in *Z. Bailloni* v. Tiegh. all or several of the upper bundles may do so.

As we have previously shown, there is no such stability in the number and behavior of petiolar bundles in the Winteraceae as hypothesized by van Tieghem. The three foliar strands of *Drimys* and *Pseudowintera* may be unmodified or they may divide to form 4–9 bundles. Furthermore, the three strands or their derivative bundles may fuse to form a single arc-shaped strand. In *Belliolum* and *Bubbia* the petiolar bundles are of variable number and one or more of them may be abaxially offset, as in *Exospermum* and *Zygogynum*. Furthermore, the bundles of the latter genera fluctuate in number, form, and orientation.

Although much more comprehensive collections of the Winteraceae must be studied in detail before attempting to differentiate species and genera upon the basis of their petiolar structure, the available evidence indicates that there are fundamentally significant trends of structural specialization within the family. Two of these trends of specialization are discernible in *Drimys*, leading (1) toward division of the three foliar strands to form more or less numerous derivative bundles, and (2) toward the fusion of bundles to form a single arc-shaped vascular strand. The former trend of specialization is intensified in *Belliolum* and *Bubbia* and attains its climax in *Exospermum* and *Zygogynum*, where the most complex and highly modified types of vascularization occur. It is significant in this connection, however, that although the range of structural variability in the Winteraceae is relatively wide, the vascularization patterns do not overlap or even simulate those that occur in *Illicium*, *Tetracentron*, *Trochodendron*, the Magnoliaceae, Schisandraceae, Degeneriaceae, or Himantandraceae.

The size, form, thickness, and texture of the lamina fluctuate markedly in different representatives of the Winteraceae, as does the venation of

³*Pseudowintera* Dandy, i.e. *Wintera* sensu v. Tiegh., non Murray.

the leaves. *Figs. 21-23* illustrate the venation patterns of *Drimys granaensis* var. *grandiflora* Hieron. (*Cuatrecasas* 6687), *Bubbia oligocarpa* (Schlecht.) Burt. (*Schlechter* 16470), and *Bubbia pachyantha* A. C. Sm. (*Brass* 4371). The three leaves exhibit such conspicuous differences as to suggest the possibility of differentiating species by characteristic features of their patterns of venation, a problem of much significance to palaeobotanists. The three leaves shown in *Figs. 18-20* are from different collections of the same species, *Drimys piperita* Hook. f. The range of structural variability within this species obviously is nearly as great as that illustrated in *Figs. 21-23*. It is evident, accordingly, that in utilizing the venation of leaves for taxonomic purposes, it is essential to examine numerous collections from different parts of the range of each species, viz. from as different environments as possible.

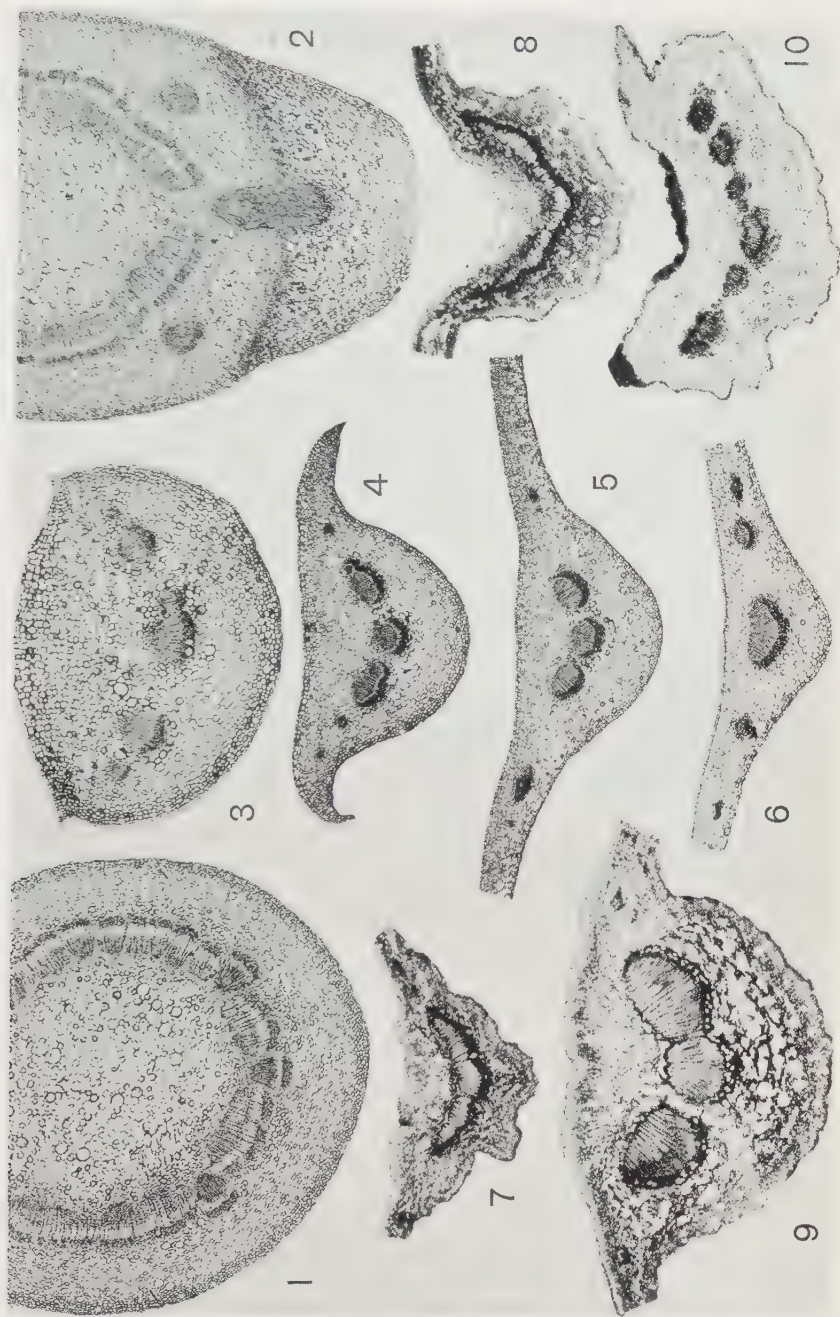
Through the collaboration of our colleague, Dr. Smith (6, 7), we have had the opportunity of studying numerous identified collections of various representatives of the Winteraceae. It is evident from analyses of this material that the ranges of structural variability differ in different genera, species, and varieties. They may or may not overlap. Thus, the terminal veinlets of the New World (*Wintera*) section of *Drimys* are typically slender, *Fig. 21*. The coarser types of venation, *Figs. 20* and *23*, apparently do not occur in the New World representatives of the Winteraceae. This is significant in view of the diverse environments in which these plants grow in Mexico, Central America, South America, and Juan Fernandez, and indicates that genetic as well as environmental factors must be assessed in studying foliar venation. Less slender types of terminal veinlets are predominant in Old World representatives of the Winteraceae; the coarser types of venation, *Figs. 20* and *23*, having been encountered commonly in *Bubbia* and *Zygogynum* and less frequently in *Belliolum* and the *Tasmannia* section of *Drimys*.

The more conspicuous fluctuations in the diameter of the veins and veinlets, illustrated in *Figs. 18-23*, are determined largely by variations in the amount of sclerenchymatous tissue that jackets the vascular bundles. In the coarser-veined types of leaves, there is a massive development of sclerenchyma about the bundles of the midrib, the veins, and the terminal veinlets. In the slender-veined leaves of the *Wintera* section of *Drimys*, on the contrary, much less sclerenchyma is formed about the bundles of the midrib and veins, and the terminal veinlets commonly are devoid of sclerenchymatous jackets. Among the Old World representatives of the Winteraceae, such veinlets are of infrequent and sporadic occurrence, having been encountered by us only in certain collections of *Drimys insipida*, *D. lanceolata*, *D. piperita*, *D. stipitata*, *Pseudowintera axillaris* var. *colorata*, *Zygogynum pomiferum*, and *Z. spathulatum*.

It should be emphasized, in conclusion, that there is a conspicuous trend of specialization in *Belliolum*, *Bubbia*, *Exospermum*, and *Zygogynum* leading toward intense sclerification of both vegetative and floral organs. The formation of very coarsely veined leaves appears to be a concomitant of this general trend of structural specialization.

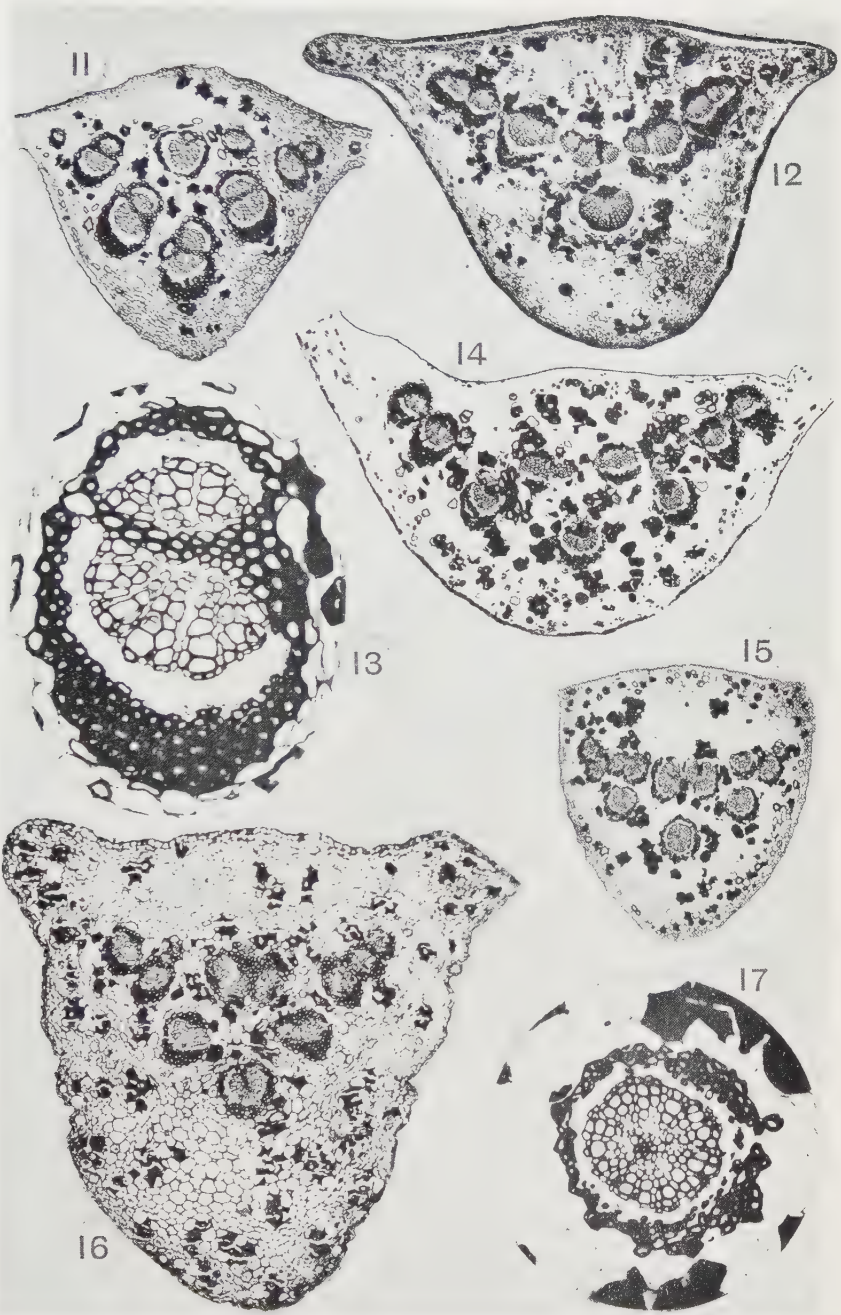
LITERATURE CITED

1. BAILEY, I. W. and R. A. HOWARD. The comparative morphology of the Icacinaceae. I. Anatomy of the node and internode. *Jour. Arnold Arb.* 22: 125-132. 1941.
2. ——— and ———. II. Vessels. *Jour. Arnold Arb.* 22: 171-187. 1941.
3. ——— and ———. III. Imperforate tracheary elements and xylem parenchyma. *Jour. Arnold Arb.* 22: 432-442. 1941.
4. ——— and ———. IV. Rays of the secondary xylem. *Jour. Arnold Arb.* 22: 556-568. 1941.
5. SINNOTT, E. W. Investigations on the phylogeny of the angiosperms. I. The anatomy of the node as an aid in the classification of angiosperms. *Am. Jour. Bot.* 1: 303-322. 1914.
6. SMITH, A. C. The American species of *Drimys*. *Jour. Arnold Arb.* 24: 1-33. 1943.
7. ———. Taxonomic notes on the Old World species of Winteraceae. *Jour. Arnold Arb.* 24: 119-164. 1943.
8. TIEGHEM, P. VAN. Sur les dicotylédones du groupe des Homoxylées. *Jour. de Bot.* 14: 259-297, 330-361. 1900.



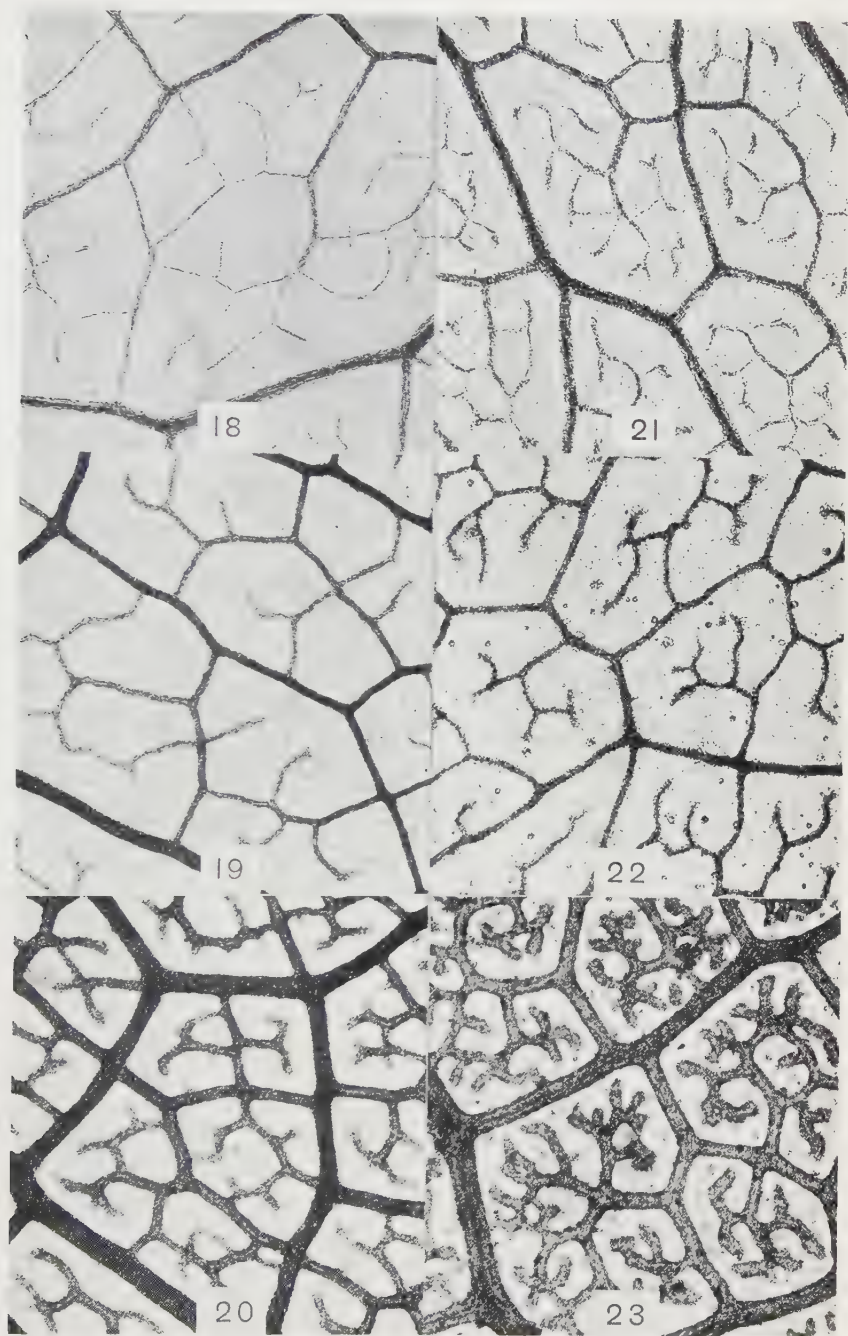
COMPARATIVE MORPHOLOGY OF THE WINTERACEAE





COMPARATIVE MORPHOLOGY OF THE WINTERACEAE





COMPARATIVE MORPHOLOGY OF THE WINTERACEAE



EXPLANATION OF PLATES

PLATE I

Figures 1-6 from greenhouse-grown material, fixed in chromo-acetic, embedded in celloidin, and stained with Haidenhain's hæmatoxylin and safranin. Figures 7-10 from herbarium material soaked in hot water and mounted in diaphane without embedding or staining. All $\times 16$.

FIG. 1. *Drimys Winteri* J. R. & G. Forst., *H. U.* 17321. Transverse section of the node, showing three foliar strands at level of departure from stele. FIG. 2. *The same*. At a slightly higher level. FIG. 3. *The same*. Transverse section of the petiole, showing six bundles of unequal sizes. FIG. 4. *The same*. Transverse section at the base of lamina showing three conspicuous bundles of the midrib and diverging veins. FIG. 5. *The same*. Transverse section of the central part of the lamina, showing three conspicuous bundles. FIG. 6. *The same*. Transverse section of the apical part of the lamina, showing single bundle in the midrib. FIG. 7. *Drimys Winteri* var. *chilensis* (DC.) A. Gray, *Muñoz B117*. Transverse section at the base of the lamina, showing arc-shaped bundle. FIG. 8. *Drimys granadensis* var. *grandiflora* Hieron., *Triana s.n.* Transverse section at the base of the lamina, showing arc-shaped bundle. FIG. 9. *Drimys Winteri* var. *chilensis*, *Pennell 12605*. Transverse section at base of the lamina, showing three bundles. FIG. 10. *Drimys granadensis* var. *grandiflora*, *Holton 673*. Transverse section of petiole, showing numerous bundles.

PLATE II

Figures 11-17 from herbarium material re-expanded in hot dilute NaOH, embedded in paraffin, and stained in Haidenhain's hæmatoxylin and safranin.

FIG. 11. *Exospermum stipitatum* (Baill.) v. Tiegh., *Vieillard 2281*. Transverse section at base of the lamina, showing numerous bundles of normal and inverted orientation, $\times 22$. FIG. 12. *Belliolum crassifolium* (Baill.) v. Tiegh., *Schlechter 15348*. Transverse section at base of the lamina, showing arc of numerous bundles and abaxially offset median bundle, $\times 22$. FIG. 13. *Exospermum stipitatum*, *Vieillard 2281*. Pair of adjacent bundles of *Fig. 11* more highly magnified, $\times 100$. FIG. 14. *Bubbia auriculata* v. Tiegh., *Vieillard 2280*. Transverse section of midrib, showing numerous bundles, three of which are abaxially offset, $\times 22$. FIG. 15. *Exospermum Lecarti* v. Tiegh., *Lécart 144*. Transverse section of petiole, showing numerous bundles, three of which are abaxially offset, $\times 22$. FIG. 16. *Zygogynum spathulatum* v. Tiegh., *Vieillard 2266*. Transverse section of petiole, showing numerous bundles, $\times 22$. FIG. 17. *Exospermum Lecarti*, *Lécart 144*. Amphicribal bundle from *Fig. 15* more highly magnified, $\times 100$.

PLATE III

Figures 18-23: Parts of leaves cleared in hot dilute NaOH and mounted unstained in diaphane. All $\times 14$.

FIG. 18. *Drimys piperita* Hook. f., *Ramos 19583*. FIG. 19. *Drimys piperita*, *Mjoberg 193*. FIG. 20. *Drimys piperita*, *Mjoberg 101*. FIG. 21. *Drimys granadensis* var. *grandiflora* Hieron., *Cuatrecasas 6687*. FIG. 22. *Bubbia oligocarpa* (Schlecht.) Burt, *Schlechter 16470*. FIG. 23. *Bubbia pachyantha* A. C. Sm., *Brass 4371*.

STUDIES OF PAPUASIAN PLANTS, VI

A. C. SMITH

*Continued from page 121***Elaeocarpus L.**

IN the account of the Papuan species of *Elaeocarpus* by Schlechter (in Bot. Jahrb. 54: 107-146. 1916), 57 species are discussed, although six of these species were insufficiently known to Schlechter and were not placed in sections by him. Since his treatment, 25 species have been described from Papuasias, mostly by R. Knuth. Thus, a total of 82 species has now been described from Papuasias; in the present treatment I describe 32 Papuan species as new, bringing the total known from our region to about 114 species.

It has been pointed out by Schlechter and many other writers that *Elaeocarpus* is a difficult genus to break up into groups, due to the extraordinarily complex inter-specific relationships. The classical division of the genus into four sections, apparently first proposed by Masters (in Hook. f. Fl. Brit. Ind. 1: 400-408. 1874) and later adopted by K. Schumann (in E. & P. Nat. Pfl. 3(6): 5. 1890), is scarcely useful, for such a complex mass of species is not divisible into such a small number of sections, at least if any degree of natural grouping is to be retained. On the other hand, it is found that the species of various regions fall into more or less recognizable groups, much smaller than the originally proposed sections. Nine of these groups were recognized and named as sections by Schlechter among the Papuan species, and my studies in the same region incline me to believe that these are more or less natural, although a certain degree of overlapping is evident. Schlechter's classification is extremely useful, and I am able to retain it with some modifications.

A classification of the Malayan species has recently been proposed by Corner (in Gard. Bull. Straits Settlements. 10: 308-329. 1939), without the use of sectional names. It remains for a monographer to bring together the treatments which have been suggested for various regions and to evaluate and limit the sections thus far named. It seems probable that the genus can be best treated by recognizing a greater number of sections than has as yet been proposed.

Before accepting Schlechter's sectional names, I attempted to typify the earlier-proposed sections in order to correlate them with Schlechter's. As a result, it seems that two of his names, § *Ptilanthus* and § *Papuanthus*, are referable to § *Ganitrus* and § *Monocera* respectively. The two remaining

sections of Masters, Schumann, etc., § *Dicera* and § *Acronodia*, appear not to occur in their limited sense in Papuasias.¹

In the following pages I attempt to place in Schlechter's system those species which were not so placed by him or which have been subsequently described, referring my new species to the appropriate groups. The following key to the Papuan sections is based primarily upon Schlechter's, with certain modifications made necessary by additional material.

KEY TO SECTIONS OCCURRING IN PAPUASIA

Ovary-locules with 2 collateral ovules.

Petals broad, bilobed.....1. § *Lobopetalum*.

Petals fimbriate, the lobes at least 5.

Segments of the petals digitate, thickened at apex; racemes ascending; petals more or less erect.2. § *Dactylosphaera*.

Segments of the petals not thickened; racemes horizontally spreading; petals spreading at anthesis.3. § *Chascanthus*.

Ovary-locules with 4-12 ovules (occasionally 2-ovulate in *E. roseo-albus* of § *Fissipetalum*).

Ovary 5 (rarely 4-, 6-, or 7-)-locular, each locule usually 4 (rarely 6-) ovulate; inflorescence usually arising from branchlets below leaves, often unilateral; fruit comparatively large, thick-walled, with frequently ornamented endocarp, the original 4-7 locules apparent but often sterile; leaves and branchlets essentially glabrous at maturity, the leaf-blades usually large, glossy, and serrulate or crenate.4. § *Ganitrus*.

¹*Elaeocarpus* § *Dicera* (Brongn. & Gris in Bull. Soc. Bot. Fr. 8: 201. 1861; Mast. in Hook. f. Fl. Brit. Ind. 1: 401. 1874; K. Schum. in E. & P. Nat. Pfl. 3(6): 5. 1890) is based on *Dicera* J. R. & G. Forst. (Char. Gen. 79. t. 40. 1776), which genus was proposed with two species, *D. dentata* and *D. serrata*, both New Zealand plants further amplified by G. Forster (Fl. Ins. Austr. Prodr. 41. 1786). Since the original illustration pertains to *Dicera dentata*, this has generally been taken to typify the Forsters' genus and thus as the type of *Elaeocarpus* § *Dicera*.

Elaeocarpus dentatus (J. R. & G. Forst.) Vahl has the following essential characters: racemes associated with the leaves; flowers of average size (petals 7-10 mm. long); petals membranaceous, strictly glabrous, and 3-lobed at the apex, the lobes rounded or undulate but not fimbriate; disk continuous, hispidulous; stamens 10-20, the anthers mucronulate or with a minute awn; ovary sericeous, 2-locular, each locule 4-ovulate [in the specimens available to me, and also in Hook. Ic. Pl. 7: t. 602 (as *E. Hinau* A. Cunn.). 1844; Cheeseman, Ill. N. Zeal. Fl. 1: pl. 24. 1914, shows the ovules as 6, and some variation in this respect is probable].

The only Papuan group of *Elaeocarpus* which suggests § *Dicera* (in its narrow sense) is § *Fissipetalum* Schlechter. However, the Papuan plants of this section have smaller flowers and petals which are definitely laciniate or fimbriate rather than broadly lobed. Therefore I follow Schlechter in taking up the sectional name *Fissipetalum* for this group of Papuan *Elaeocarpi*, although it is possible that a student of the entire genus may consider the petal characters secondary and refer this group to § *Dicera*. The extent of § *Dicera* beyond New Zealand, in its limited application, is questionable, but it has obviously been much too broadly interpreted by Masters and others.

Elaeocarpus § *Acronodia* (Mast. in Hook. f. Fl. Brit. Ind. 1: 408. 1874; K. Schum. in E. & P. Nat. Pfl. 3(6): 5. 1890) is based on *E. Acronodia* Mast. (*Acronodia punctata* Bl., not *Elaeocarpus punctatus* Wall.). It is a very distinct and natural group, with tetramerous flowers and staminate and monoecious individuals. Some authors (e. g. Corner in Gard. Bull. Straits Settle. 10: 309. 1939) imply that *Acronodia* is worthy of subgeneric rank. It apparently does not extend east to Papuasias and thus does not concern the present problem.

Ovary 2- or 3-locular (said to be 5-locular in *E. sterrophyllus* of § *Oreocarpus*); fruit at maturity usually 1-locular, sometimes probably 2- or 3-locular.

Petals thinner than the sepals and usually obviously different, clearly broadened at apex.

Ovary-locules usually 4-ovulate (occasionally 2-ovulate in *E. roseo-albus* and 6-ovulate in *E. polydactylus*); inflorescences slender, associated with the leaves at anthesis; flowers small (petals up to 6 mm. long, usually essentially glabrous); stamens 10-30, erostrate; fruit comparatively thick-walled.

.....5. § *Fissipetalum*.
Ovary-locules 6-12-ovulate (very rarely 4-ovulate; if 4- or 6-ovulate, the other characters obviously not of § *Fissipetalum*).

Flowers very large for the genus (petals often exceeding 20 mm. in length); leaves large, usually aggregated at ends of thick branchlets; flowers arranged in comparatively short few-flowered racemes arising from the branchlets below leaves; stamens numerous (frequently 50-100 or more), with conspicuously awned anthers; ovary sericeous; fruit large, somewhat flattened, the endocarp also flattened.8. § *Monocera*.

Flowers smaller (petals not exceeding 20 mm. in length, in most species much smaller); leaves not aggregated in terminal clusters; racemes often elongated and many-flowered; stamens fewer (usually 15-50); fruit round in cross-section, not flattened.

Ovary glabrous.6. § *Oreocarpus*.

Ovary sericeous.7. § *Blepharoceras*.

Petals about the size of the sepals (usually less than 8 mm. long) and often somewhat similar in texture, usually narrowed distally and subentire or obscurely toothed (in a few species broadened at apex and distinctly fimbriate), densely sericeous without and often within, often with a conspicuous swollen carina within; ovary-locules 6-12-ovulate; fruits comparatively small, the pericarp rarely exceeding 3 mm. in thickness.9. § *Coilopetalum*.

1. § LOBOPETALUM

Elaeocarpus § *Lobopetalum* Schlechter in Bot. Jahrb. 54: 109. 1916.

Based on the single species *E. bilobatus* Schlechter and its variety *acutatus* Schlechter, both entities from the Sepik region of Northeastern New Guinea, this section appears not to be represented in the material of the Archbold collections.

2. § DACTYLOSPHAERA

Elaeocarpus § *Dactylosphaera* Schlechter in Bot. Jahrb. 54: 111. 1916.

In addition to the six species upon which Schlechter originally founded this well-marked section, *E. Lamii* O. C. Schmidt and the new species described below also belong in § *Dactylosphaera*. The original six species are obviously closely related and Schlechter did not designate a type for the section. Since *E. heptadactylus* Schlechter is the only species illustrated by him, this may be designated as the lectotype of the section.

Elaeocarpus (§ *Dactylosphaera*) *myrmecophilus* sp. nov.

Arbor 5-6 m. alta, ramulis validis subteretibus fistulosis apicem versus puberulis et 7-10 mm. diametro demum glabratiss; foliis apicem ramulorum versus congestis, petiolis subnullis, laminis chartaceis in sicco fusco-olivaceis anguste spatulato-obovatis, (15-) 20-30 cm. longis, 5-8.5 cm. latis, basim versus gradatim angustatis et basi ipso late obtusis vel abrupte rotundatis, apice obtusis vel rotundatis, margine apiculato-crenulatis (dentibus 1 vel 2 per centimetrum), utrinque glabris vel costa nervisque obscure

puberulis, costa valida utrinque prominente, nervis lateralibus utrinsecus 15–20 patentibus copiose anastomosantibus supra paullo subtus valde elevatis, rete venularum intricato conspicuo utrinque valde prominulo; racemis erectis 10–21 cm. longis, basi bracteis foliaceis deltoideis ad 3 cm. longis interdum subtentis, pedunculo brevi squamulis deltoideis puberulis circiter 2 mm. longis saepe vestito, rhachi angulata puberula gracili (1–1.5 mm. diametro); floribus numerosis, pedicellis curvatis gracilibus 3–5 mm. longis minute sericeo-puberulis; sepalis papyraceis deltoideo-oblongis, 3.5–4 mm. longis, 1.5–2 mm. latis, subacutis, utrinque obscure puberulis; petalis tenuiter carnosus unguiculato-cuneatis, 3.5–4 mm. longis, 1.5–2 mm. latis, intus basim versus et margine puberulis, superne in segmentis 6–8 subaequalibus circiter 1 mm. longis apice globoso-incrassatis divis; disci lobis 5 sepalis oppositis liberis carnosus minute puberulis oblongis circiter 1 mm. longis et latis, apice truncato emarginatis; staminibus 15, glabris vel apice antherarum inconspicue setulosis, 2–2.5 mm. longis, antheris quam filamentis paullo longioribus apice truncatis; ovario conico conspicue 5-angulato minute puberulo 3-loculari, ovulis 2 in quoque loculo, stylo gracili circiter 1.5 mm. longo superne glabro.

NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., *Brass* 13231 (TYPE), Mar. 1938 (tree 5–6 m. high, occasional on higher banks of river in rain-forest; branches upright, inhabited by ants; flowers green).

This species of § *Dactylosphaera* is very distinct in its sessile long narrowly spatulate-obovate leaf-blades, elongate racemes, and comparatively large flowers. In other characters it is perhaps most suggestive of *E. dolichodactylus* Schlechter.

Elaeocarpus (§ *Dactylosphaera*) *pachydactylus* Schlechter in Bot. Jahrb. 54: 113. 1916.

NETHERLANDS NEW GUINEA: Hollandia, Bernhard bivak, alt. about 55 m., *Neth. Ind. For. Serv.* 25756.

The cited specimen bears juvenile inflorescences, but in all respects agrees well with the description of *E. pachydactylus*, previously known only from the Sepik region of Northeastern New Guinea, also at low elevation.

3. § CHASCANTHUS

Elaeocarpus § *Chascanthus* Schlechter in Bot. Jahrb. 54: 115. 1916.

In proposing this very sharply marked section, based on two new species, Schlechter did not designate a type. However, since *E. multisectus* Schlechter is illustrated, this may arbitrarily be taken as the lectotype of the section. Duplicates of the type of *E. multisectus*, Schlechter 16521, are available at UC. Since Schlechter's treatment, no other species referable to § *Chascanthus* appear to have been described; below I propose two new species which are obviously of this relationship. In addition, *Brass* 6956 and 7282, from the Fly River region of British New Guinea, represent a new species of § *Chascanthus*; these specimens bear a manuscript name of Knuth which may already have been published.

Elaeocarpus (§ *Chascanthus*) *solomonensis* sp. nov.

Arbor ad 25 m. alta, ramulis gracilibus teretibus apicem versus puberulis cito glabris purpurascenscentibus vel cinereo-fuscescentibus; petiolis conspicuis gracilibus (0.5–1 mm. diametro) canaliculatis, glabris vel incon-

spicue puberulis, 1–2 cm. longis, basi et apice paullo incrassatis; laminis papyraceis siccitate fusco-olivaceis oblongo-ellipticis, (6–) 10–13 cm. longis, (2–) 3–5 cm. latis, basi late obtusis, apice in acuminem ad 1.5 cm. longum gradatim angustatis, margine regulariter crenato-serrulatis (dentibus 3–5 per centimetrum primo saepe calloso-mucronulatis demum spinulosis vel obtusis), utrinque glabris vel costa juvenili obscure puberulo-sericeis, subtus in axillis nervorum interdum domatiiferis; racemis e ramulis infra folia ortis patentibus sub anthesi 15–30 cm. longis laxe multifloris, pedunculo brevi et rhachi gracilibus (1–1.5 mm. diametro) pedicellisque arcte cinereo-puberulis, pedicellis gracillimis subrectis 5–18 mm. longis; alabastris late conicis 3–4 mm. longis; sepalis submembranaceis elliptico-ovatis acutis, 4–5 mm. longis, 1.5–2 mm. latis, extus obscure puberulis, intus glabris; petalis submembranaceis ex ungue brevi perlate cuneatis, 6–7 mm. longis, apice 7–10 mm. latis, margine (et marginibus loborum) haud hispidulis ceterum glabris, infra medium plerumque 5- vel 6-lobatis, parte apicali in segmenta 60–90 linearia acuta copiose et irregulariter fimbriatis; disci lobis 5 sepalis oppositis oblongo-subglobois, circiter 1 mm. diametro, minute et dense brunneo-velutinis, apice truncatis; staminibus 30–35 ubique minute hispidulis 4–4.5 mm. longis, filamentis gracilibus curvatis circiter 1.5 mm. longis, antheris erectis oblongo-subulatis 2.5–3 mm. longis apice acutis; ovario copiose et breviter pallido-sericeo 3-loculari, ovulis in quoque loculo 2 elongatis, stylo subulato circiter 1.5 mm. longo superne glabro; racemis pedicellisque sub fructu incrassatis, rhachis parte apicali interdum delapsa; fructibus ellipsoideis, maturitate 15–22 mm. longis et 8–13 mm. latis, basi et apice obtusis, pericarpio (epicarpio azureo duro et endocarpio crasso ruguloso inclusis) 2–4 mm. crasso, semine solitario oblongo-ellipsoideo.

SOLOMON ISLANDS: Bougainville: Siwai, *Waterhouse* 96 (A, NY), 177 (A, NY) (trees 10–20 m. high, in jungle; native name: *ruhonai*); Kupei Gold Field, alt. 1200 m., *Kajewski* 1752 (tree to 20 m. high, common in rain-forest; fruit blue); Guadalcanal: Uulolo, Tutuve Mt., alt. 1200 m., *Kajewski* 2608 (common tree to 20 m. high with medium buttresses; bark fairly smooth; wood white, soft; fruit blue; native name: *chikora*); Malaita: Quoiimonapu, alt. 50 m., *Kajewski* 2327 (TYPE), Dec. 10, 1930 (tree to 25 m. high, common in rain-forest; trunk without prominent flanges or buttresses; flowers faintly scented, the petals white, feathery, the stamens black; native name: *isikor*); San Cristoval: Magoha River, *Brass* 2751 (slender tree 20 m. high, in lowland rain-forest; bark pale brown, slightly flaky; wood soft, pale; leaf-blades smooth and shining above, paler beneath; fruit pale blue).

In spite of the altitudinal range indicated by the above-cited specimens, there can be no doubt that all are conspecific. The only specimen with mature flowers is indicated as the type, but younger inflorescences, agreeing in all details, are found on *Waterhouse* 177 and *Kajewski* 2608. Fruiting specimens are *Kajewski* 1752 and 2608 and *Brass* 2751.

Elaeocarpus solomonensis is a close relative of the New Guinean *E. multi-sectus* Schlechter, the two species agreeing in the texture, shape, and margins of leaves, their elongate inflorescences, copiously and irregularly fimbriate petals, erect blackish anthers on curved filaments, etc. However, the new species has the leaf-blades strictly glabrous at maturity (rather than sericeous-puberulent on both surfaces and persistently so beneath), the pedicels comparatively slender, and the petals glabrous except for a few

hairs at margins (rather than barbate on the claw without). In foliage, *E. solomonensis* suggests the specimens which I refer to *E. fauroensis* Hemsl. (see discussion below under § *Ganitrus*). However, *E. fauroensis* has a nearly globose fruit, larger and thicker-walled than that described above. Furthermore, Hemsley's species has somewhat larger leaf-blades, which are often broadest above the middle, and its petioles are shorter and much stouter than those of the new species.

Elaeocarpus (§ *Chascanthus*) *leucanthus* sp. nov.

Arbor ad 14 m. alta, ramulis subteretibus apicem versus 2–3 mm. diametro et brunneo-hirtis cito nigrescentibus glabratibus; petiolis gracilibus 1.5–3.5 cm. longis ut ramulis decidue hirtis, basi et apice incrassatis; laminis chartaceis vel subcoriaceis in sicco fuscis ellipticis, 8–14 cm. longis, 3–6 cm. latis, basi late obtusis, apice in acuminem ad 1.5 cm. longum subito cuspidatis, margine recurvo obscure serrato-crenulatis (dentibus 1 vel 2 per centimetrum), supra glabris vel juventute sericeo-hirtellis, subtus praesertim nervis breviter brunneo-hirtellis, costa supra paullo subtus valde prominente, nervis lateralibus utrinsecus 5–7 arcuato-adscedentibus anastomosantibus supra subplanis subtus elevatis, rete venularum utrinque perspicue prominulo; racemis axillaribus vel infra folia orientibus sub anthesi 5–12 cm. longis, pedunculo brevi et rhachi gracilibus (0.5–1 mm. diametro) pedicellis pilis circiter 0.5 mm. longis copiose brunneo-hirtis; floribus plerumque 15–20 per inflorescentiam, pedicellis gracilibus sub anthesi 12–20 mm. longis, alabastris anguste elongatis; sepalis tenuiter papyraceis lanceolatis, 7–8 mm. longis, circiter 1.5 mm. latis, acutis, utrinque obscure puberulis; petalis membranaceis oblongo-cuneatis, 9–10 mm. longis, 3.5–4.5 mm. latis, utrinque praesertim inferne sericeis, basi angustatis, parte apicali in segmenta 19–21 linearia obtusa leviter inaequalia pectinatis; disci lobis 5 sepalis oppositis subconnatis carnosius oblongis circiter 1 mm. longis et latis, dense sericeis, apice truncatis; staminibus circiter 20, 3–3.5 mm. longis, filamentis gracilibus glabris circiter 1 mm. longis, antheris membranaceis 2–2.5 mm. longis superne obscure hispidulis apice setas 8–12 conspicuas 0.3–1 mm. longas gerentibus; ovario ellipsoideo pilis circiter 0.8 mm. longis dense aureo-sericeo 3-loculari, ovulis in quoque loculo 2, stylo subulato circiter 4 mm. longo superne glabro; fructibus paucis ut videtur saepe 1 per inflorescentiam, immaturis ellipsoideis ad 25 × 18 mm., pericarpio duro 2–3 mm. crasso extus ruguloso et pallido-lenticellato.

NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, alt. 1600 m., *Brass* 12229 (TYPE), Jan. 1939 (tree 14 m. high, in rain-forest on side of a ravine, the trunk 20 cm. diam.; flowers white).

Elaeocarpus leucanthus, of the alliance of *E. multisectus* Schlechter, clearly differs from that species in its thick leaf-blades with more obvious veinlets and less evident serrations, its shorter and more slender inflorescences with larger flowers, its less deeply and less copiously fimbriate petals, and its fewer stamens, which are conspicuously setose at apex.

4. § GANITRUS

Elaeocarpus § *Ganitrus* Brongn. & Gris in Bull. Soc. Bot. Fr. 8: 202. 1861; Mast. in Hook. f. Fl. Brit. Ind. 1: 400. 1874; K. Schum. in E. & P. Nat. Pfl. 3(6): 5. 1890.

Elaeocarpus b. *Ganitrus* Endl. Gen. Pl. 1011. 1840.

Elaeocarpus § *Ptilanthus* Schlechter in Bot. Jahrb. 54: 121. 1916.

Elaeocarpus § *Ganitrus* is founded nomenclaturally on *E. sphaericus* (Gaertn.) K. Schum. [*Ganitrus sphaericus* Gaertn.; *Elaeocarpus Ganitrus* Roxb.]. Gaertner (Fruct. 2: 271. t. 139, f. 6. 1791) took his generic name from *Ganitrus* Rumphius (Herb. Amb. 3: 160. t. 101. 1743), but his description was based on an actual specimen and his species must be interpreted from the material described, rather than from Rumphius' description and plate (see Merrill, Interpret. Herb. Amb. 351. 1917). *Ganitrus sphaericus* Gaertn., therefore, is an Indian species, and the identity of *Ganitrus* Rumph. (probably = *Elaeocarpus amboinensis* Merr., op. cit. 350) is not germane to an interpretation of *Elaeocarpus* § *Ganitrus*. *Elaeocarpus sphaericus* (Gaertn.) K. Schum. has been interpreted rather widely by most recent students, and its range is often stated as extending throughout Malaysia and even into New Guinea (e. g. Koorders & Valetton in Meded. Lands. Plant. 33: 419. 1900; Merrill in Contr. Arnold Arb. 8: 100. 1934; Corner in Gard. Bull. Straits Settlement. 10: 326. 1939). At present I cannot express an opinion on the true extent of this Indian species, but I have seen no New Guinean material which seems conspecific with *E. sphaericus*.

The essential characters of *Elaeocarpus* § *Ganitrus*, as typified by *E. sphaericus*, agree with those of *Elaeocarpus* § *Ptilanthus*, as was realized by Schlechter (in Bot. Jahrb. 54: 121. 1916). However, Schlechter felt that § *Ganitrus* had been too broadly interpreted and that not enough weight had been given to the number of ovules in the ovary-locules, and therefore he proposed to place the New Guinean plants of this relationship in a new section, *Ptilanthus*. In the New Guinean material available to him, Schlechter found four ovules per locule to be the uniform number. However, I now find that the locules of *E. trifidus* (described below) and sometimes those of *E. kaniensis* Schlechter are 6-ovulate; nevertheless these species are definitely members of § *Ptilanthus* Schlechter. The number of ovary-locules is not necessarily uniformly five as supposed by Schlechter, but may vary from four to seven.

Elaeocarpus sphaericus has large 5-locular fruits with a strongly rugulose endocarp; the number of ovules in the ovary-locules of the flower is not stated in the treatments examined by me, but Wight's illustration (Ic. Pl. Ind. Or. 1: t. 56. 1838) shows them to be probably six, while Endlicher (Gen. Pl. 1011. 1840) states, for *Elaeocarpus* b. *Ganitrus*, "... loculis quadriovalatis." At any rate, I believe that variation in the ovule-number within sections is somewhat greater than implied by Schlechter. In view of the fact that all the other essential characters of the two groups agree, I believe that § *Ptilanthus* must be placed in synonymy under § *Ganitrus*. The actual limits of this group, both morphological and geographical, cannot be stated without detailed study of the genus, but it is now known from India to the Solomon Islands.

§ *Ptilanthus* was originally erected by Schlechter to include eight species; no type was designated, but the sectional name implies that *E. ptilanthus*

Schlechter was intended as the basic species. To these eight Papuan species (herewith transferred to § *Ganitrus*) must be added three others which are already described: *E. orohensis* Schlechter (originally placed in § *Blepharoceras*), *E. jauroensis* Hemsl., and *E. breviracemosus* Knuth. These three species are discussed below. Here I also add six new species, so that § *Ganitrus* in Papuaia is now composed of 17 species.

The essential diagnostic characters of § *Ganitrus*, at least as I assume it to be represented in Papuaia, are as follows: branches and branchlets comparatively stout; leaves and branchlets essentially glabrous, or sericeous or closely tomentellous on young parts; leaf-blades usually large, often glossy, oblong or obovate, serrulate or crenate, rarely velutinous on nerves beneath; inflorescences usually arising from branchlets below leaves, only rarely associated with the leaves, often unilateral; petals somewhat larger and thinner than the sepals, often essentially glabrous or puberulent to short-sericeous, usually deeply lacinate; stamens often numerous, the anthers often elongate, awned or not; style long, the ovary sericeous, 5 (rarely 4-7)-locular, the ovules 4 (rarely 6) per locule; fruit comparatively large, thick-walled.

Elaeocarpus (§ *Ganitrus*) *kaniensis* Schlechter in Bot. Jahrb. 54: 123. 1916.

NORTHEASTERN NEW GUINEA: Kani-Gebirges (Minjem River region), alt. about 600 m., Schlechter 17893 (TYPE COLL.); Morobe District, alt. 250-1350 m., Sattelberg, Clemens 3095 (flowers yellowish); Salamaua, Clemens 7 (tree about 15 m. high; fruit bright blue); Yunzaing, Clemens 4142 (tree, in secondary forest; fruit blue); Boana, Clemens 41711 (fruit blue); Gaeng Station, Clemens 41295 (tall tree, the trunk up to 1 m. diam.; fruit green, immature).

Elaeocarpus kaniensis, previously reported only from the type collection, appears to be fairly common in the Morobe District. Schlechter points out that its petals are unusual in § *Ptilanthus* [i. e. § *Ganitrus*] because of their concave elliptic shape, narrowed apex, and obscure laciniae, all these points being suggestive of § *Coilopetalum*. However, the petals lack the dense sericeous pubescence and the swollen carina usually found in § *Coilopetalum*, and on the basis of all its other characters, including the 5-locular ovary, *E. kaniensis* is indubitably correctly placed in § *Ganitrus*.

The flowers of Clemens 3095 agree precisely with those of the type collection, but, being perhaps somewhat more mature, they permit an amplification of the dimensions given by Schlechter. The sepals may be up to 6×2.5 mm. and the petals to 8×3 mm.; the stamens have short filaments and anthers about 2.5 mm. long. The petals are usually lacinate to about one-third their length with 8 or 9 lanceolate teeth. The five ovary-locules may have either 4 or 6 ovules each, this number being variable even in the same flower.

All of the Clemens collections except no. 3095 are in fruit. The fruits are subglobose or slightly ellipsoid, 18-30 mm. in diameter at maturity. The epicarp is thin and brittle when dry and the mesocarp is somewhat fibrous. The endocarp is hard and bony, very thick, in larger specimens with numerous irregularly oblong processes which are 4-6 mm. long. In smaller fruits, the endocarp is merely conspicuously rugose, without ex-

tended processes. The locules are small, consistently 5, each with a single seed.

Elaeocarpus (§ *Ganitrus*) *altisectus* Schlechter in Bot. Jahrb. 54: 123. 1916.

NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, alt. 75 m., *Brass & Versteegh 13569* (tree 31 m. high, frequent in primary rain-forest, on the lower mountain-slopes; trunk 42 cm. diam.; crown not wide-spreading; bark 7 mm. thick, gray-brown, fissured; sap-wood light brown; heart-wood brown; fruits dark green).

The cited specimen agrees very well in foliage with Schlechter's description of *E. altisectus*, based on specimens from the Sepik region at 20–100 m. altitude. The species is characterized by its narrowly oblong-obovate obtuse leaf-blades and very short winged petioles. No. 13569 bears fruits, doubtless immature, which are subglobose, up to 12 mm. in diameter, rugulose, with a thick pericarp (2–3 mm. thick). The epicarp is hard, the endocarp bony and irregularly sulcate, the locules 5 and apparently each 1-seeded. The mature fruit is doubtless larger and probably the endocarp develops more obvious processes.

Elaeocarpus (§ *Ganitrus*) *trifidus* sp. nov.

Arbor ad 30 m. alta, ramulis juventute angulatis saepe dense tomentello-puberulis cito subteretibus cinereo-purpurascentibus glabratibus; petiolis ut ramulis saepe puberulis glabratibusque supra complanatis 8–18 mm. longis; laminis chartaceis vel subcoriaceis in sicco olivaceo-fuscis ellipticis vel obovato-ellipticis, 7–12 cm. longis, 3–5 cm. latis, basi in petiolum gradatim angustatis et decurrentibus, apice breviter cuspidatis, margine serrulatis (dentibus 3–6 per centimetrum primo setulosis mox obtusis), utrinque glabris vel subtus praecipue nervis interdum supra costa dense puberulis cito glabratibus, costa utrinque prominente, nervis lateralibus utrinsecus 7–10 arcuato-adscententibus anastomosantibus utrinque elevatis, rete venularum intricato utrinque prominulo; racemis in ligno vetustiore ortis vel interdum axillaribus patentibus 6–12 cm. longis plerumque 20–30-floris et secundifloris, pedunculo brevi et rhachi sub anthesi circiter 1 mm. diametro pedicellisque dense hispidulo-puberulis, pedicellis gracilibus sub anthesi 10–14 mm. longis, alabastris breviter conicis ad 5 mm. longis conspicue cuspidatis; sepalis papyraceis ovato-lanceolatis, 5.5–6 mm. longis, 1.7–2 mm. latis, acuminatis, basim versus intus paullo incrassatis, utrinque puberulis; petalis subcarnosis ovato-oblongis, circiter 8 mm. longis, inferne 2–2.5 mm. latis, superne angustatis, basi ipso angustissimis, usque infra medium in lacinias 5–6 mm. longas irregulariter 2- vel 3-lacinulatas raro integras trifidas, margine inferne tomentello-ciliolatis, intus basim versus sericeis; disco annulari-pulvinato leviter crenulato minute hispidulo circiter 0.5 mm. alto; staminibus 2- vel 3-seriatis plerumque 50–60 praeter setas apicales 2.5–3.5 mm. longis, filamentis hispidulis brevibus, antheris 1.5–2.5 mm. longis ubique obscure setulosis apice in setas 1–3 ad 0.8 mm. longas productis; ovario subgloboso et styli basi dense sericeo-puberulis, loculis 6 (raro 7) 6-ovulatis, stylo crasso subulato 5–7 mm. longo; pedicellis sub fructu incrassatis, fructibus subglobosis maturitate ad 27 mm. diametro, epicarpio tenui duro, mesocarpio fibroso, endocarpio crasso osseo processibus irregularibus 3–6 mm. longis copiose ornato, loculis 6 vel 7 interdum sterilibus, semine in quoque loculo solitario.

NETHERLANDS NEW GUINEA: 2–4 km. southwest of Bernhard Camp, Idenburg

River, alt. 900–950 m., *Brass* 13290 (TYPE), Mar. 1939, *Brass & Versteegh* 13148, 13527 (trees 20–30 m. high, occasional in rain-forest, sometimes in primary mossy-forest on ridges; trunk 20–48 cm. diam.; crown not wide-spreading; bark 12–15 mm. thick, dark brown or black, scaly; sap-wood light yellow; heart-wood brown-yellow or brown-green; flowers cream-colored; fruits dark green or blue).

The only flowering specimen is designated as the type; no. 13148 bears young fruits and no. 13527 apparently mature fruits, which are described above. The fruiting specimens are glabrous throughout, whereas the flowering specimen has the branchlets, petioles, and leaf-blades puberulent, although these parts even here are glabrescent. In its deeply 3-lobed petals and its floral dimensions, *E. trifidus* suggests *E. altisectus* Schlechter, doubtless its closest relative, from which it differs in its longer-petiolate leaf-blades with cuspidate apices. The ovary-locules of the new species are 6 or 7 rather than 5, a feature which has not been otherwise noted in § *Ganitrus* but which is probably of little consequence. Furthermore, the ovules are consistently 6 per locule, and therefore the plant would fall into § *Blepharoceras* in Schlechter's key to the sections. In all its other characters of foliage, inflorescence, and fruit, *E. trifidus* obviously represents § *Ganitrus*, the characters of which must therefore be modified.

Another specimen which very possibly represents *E. trifidus* is *Brass & Versteegh* 11915, collected at 1740 m., 15 km. southwest of Bernhard Camp. This specimen bears mature fruits similar to those above-described in all respects except for having 5 locules. I do not positively refer the collection to *E. trifidus* because its leaves are also strongly suggestive of *E. acutifidus* (described below), in which the fruit is 5-locular; the two species concerned are difficult to distinguish without flowers.

Elaeocarpus (§ *Ganitrus*) *acutifidus* sp. nov.

Arbor ad 24 m. alta, ramulis juvenilibus cinereo-sericeo-puberulis angulatis mox teretibus glabris saepe nigrescentibus; petiolis gracilibus supra canaliculatis 7–15 mm. longis ut ramulis puberulis mox glabris; laminis in sicco fusco-olivaceis chartaceis supra nitidis utrinque glabris oblongo-ellipticis, 7–13 cm. longis, (2.5–) 3–6 cm. latis, basi acutis et in petiolum decurrentibus, apice cuspidatis, margine dentibus 3–5 per centimetrum primo spinulosis serrulatis, costa supra paullo subtus valde prominente, nervis lateralibus utrinsecus 8–12 erecto-patentibus utrinque peracate elevatis, rete venularum intricato copioso utrinque valde prominulo; racemis in ligno vetustiore ortis patentibus 4–6 cm. longis ut videtur circiter 15-floris, pedunculo brevi et rhachi angulata circiter 1 mm. diametro pedicellis breviser sericeo-puberulis, pedicellis gracilibus sub anthesi 10–14 mm. longis, alabastris ellipsoideo-conicis ad 8 mm. longis conspicue acuminatis; sepalis submembranaceis acutis oblongo-lanceolatis, 12–15 mm. longis, 2.5–3 mm. latis, utrinque minute puberulis glabrisque; petalis membranaceis anguste oblongo-cuneatis, 17–20 mm. longis, 5–6 mm. latis, basim versus margine sericeo-puberulis, ceterum glabris, in lacinias 10–14 acutas 3–9 mm. longas irregulariter fissis; disco annulari-pulvinato 1–1.5 mm. alto crenulato minute hispidulo-velutino; staminibus 40–42 plerumque biseriatis erectis 7–10 mm. longis ubique breviter setuloso-sericeis, filamentis 2–3 mm. longis, antheris 5–8 mm. longis apice setas 1–3 ad 1 mm. longas gerentibus; ovario 5-loculari et styli basi pallide sericeis, loculis 4-ovulatis,

stylo crasso-subulato 18–21 mm. longo petala conspicue superante; rhachi pedicellis sub fructu valde incrassatis, pedicellis ad 20 mm. longis et 3 mm. diametro; fructibus subglobosis maturitate 3.5–4.5 cm. diametro, basi obtuso-rotundatis, apice abrupte cuspidatis, epicarpio tenui duro valde ruguloso, mesocarpio fibroso, endocarpio crasso osseo processibus irregularibus ad 1 cm. longis implicite ornato etiam lacunis parvis hinc inde pervaso, loculis 5 interdum abortivis, semine in quoque loculo solitario.

NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, alt. 2300–2340 m., *Brass & Versteegh 11158* (TYPE), Nov. 23, 1938 (tree 24 m. high, frequent in primary forest on slope of a ridge; trunk 32 cm. diam.; crown not wide-spreading; bark 8 mm. thick, fairly smooth, brown; wood white; flowers white; young fruits dark green), *Brass & Versteegh 11136* (tree 19 m. high, common in old secondary forest on slope of a ridge; trunk 35 cm. diam.; crown not wide-spreading; bark 8 mm. thick, gray, rough; wood white; fruits dark green).

Flowers are described from the type, mature fruits from no. 11136. The closest relative of *E. acutifidus* is doubtless *E. ptilanthus* Schlechter, the two species having in common a comparatively short and few-flowered inflorescence. The type of *E. ptilanthus* is from the Sepik region of North-eastern New Guinea, and Schlechter cites 11 Ledermann collections as probably representing the species; for the purpose of interpreting it, however, only the type and two other flowering specimens need be considered. These are characterized not only by their few flowers, but also by having only about 15 stamens. From *E. ptilanthus*, as described, *E. acutifidus* differs in its longer petioles and broader and elliptic rather than oblong-spatulate leaf-blades. The flowers of the two species are quite similar in shape of parts, but those of the new species have larger sepals, petals, and stamens; its petals are more finely laciniate and its stamens are 40–42 rather than about 15. In foliage, *E. acutifidus* is suggestive of *E. trifidus* (described above), but the differences between these two species in flower-size, petal-cutting, anthers, etc., are numerous and obvious.

Elaeocarpus (§ *Ganitrus*) *aemulus* sp. nov.

Arbor ad 27 m. alta *E. acutifido* supra descripto valde affinis, foliis floribusque minoribus, staminibus paucioribus, stylo multo brevior differt; petiolis 7–10 mm. longis, laminis 7–10 cm. longis, 2.5–3.5 cm. latis, apice obtusis, nervis lateralibus utrinsecus 7–10; racemis 3–4 cm. longis 5–10-floris, pedicellis sub anthesi 7–10 mm. longis; sepalis 10–11 × 2–2.5 mm.; petalis 15–16 × 5–6 mm., in lacinias 9–12 acutas 3–8 mm. longas fissis; staminibus 30–32 erectis 7–8.5 mm. longis, antheris 5–6 mm. longis; stylo 9–10 mm. longo quam petalis valde brevior; fructibus (unico viso) subglobosis circiter 2 cm. diametro.

NORTHEASTERN NEW GUINEA: Morobe District, Ogeramngang, alt. about 1780 m., *Clemens 5019* (TYPE), Jan. 16, 1937; above Kaile, enroute to Sarawaket, alt. 1650–1800 m., *Clemens 4910* (tree 25–27 m. high, in wet forest by stream; fruit blue).

In many respects, *E. aemulus* is intermediate between *E. ptilanthus* Schlechter and *E. acutifidus* (described above), its closest allies. The possibility that this species and *E. acutifidus* are only varietally distinct is to be considered, but for the time being I think it best to designate them as species. The differentiating floral characters are matters of degree, the

most marked difference being in length of style. The diagnostic characters of these three closely related species are as follows:

Petiole 5–8 mm. long; leaf-blades oblong-spatulate, $5-9 \times 2-3.5$ cm., obtuse; sepals about 10 mm. long; petals about 13 mm. long, fimbriate with 7–9 teeth; stamens about 15, about 6 mm. long; style exceeding the petals. *E. ptilanthus*.

Petiole 7–10 mm. long; leaf-blades oblong-elliptic, $7-10 \times 2.5-3.5$ cm., obtuse; sepals 10–11 mm. long; petals 15–16 mm. long, fimbriate with 9–12 teeth; stamens 30–32, 7–8.5 mm. long; style 9–10 mm. long, shorter than petals. *E. aemulus*.

Petiole 7–15 mm. long; leaf-blades oblong-elliptic, $7-13 \times 3-6$ cm., cuspidate; sepals 12–15 mm. long; petals 17–20 mm. long, fimbriate with 10–14 teeth; stamens 40–42, 7–10 mm. long; style 18–21 mm. long, exceeding the petals. . . *E. acutifidus*.

Elaeocarpus (§ *Ganitrus*) *chloranthus* sp. nov.

Arbor ad 25 m. alta ubique inflorescentiis exceptis glabra (partibus juvenilibus forsan puberulis), ramulis subteretibus crassis apicem versus saepe ad 7 mm. diametro dense foliatis; petiolis brevibus late alatis 2–5 mm. longis; laminis papyraceis in sicco fusco-viridibus anguste obovatis, (7–) 11–20 cm. longis, (3–) 4–7 cm. latis, basi in petiolum conspicue decurrentibus, apice rotundatis vel late obtusis, margine inconspicue crenulato-denticulatis (dentibus 3–6 per centimetrum primo spinulosis), supra nitidis, costa valida supra subplana vel elevata subtus prominente, nervis lateralibus utrinsecus 15–20 patentibus curvatis anastomosantibus utrinque peracute prominulis, rete venularum intricato utrinque valde prominulo; racemis in ligno vetustiore ortis patentibus 5–9 cm. longis secundifloris, pedunculo brevi et rhachi robusta striata pedicellisque breviter sericeo-puberulis, floribus confertis, bracteis oblongo-linearibus 4–6 mm. longis puberulis mox caducis, pedicellis gracilibus sub anthesi 5–9 mm. longis; sepalis papyraceis lanceolatis acutis, 8–9 mm. longis, circiter 2 mm. latis, utrinque obscure puberulis; petalis membranaceis anguste oblongo-cuneatis, 15–16 mm. longis, 4–5 mm. latis, intus et margine basim versus sericeo-puberulis, in lacinias 13–20 acutas 3–6 mm. longas irregulariter fissis; disco annulari-pulvinato obscure crenulato circiter 0.7 mm. alto minute hirtello; staminibus 27–32 plerumque biseriatis 7–10 mm. longis ubique minute setulosis, filamentis 1.5–3 mm. longis, antheris 5–7 mm. longis in apicem acutum gradatim angustatis; ovario 5-loculari et styli basi breviter sericeis, loculis 4-ovulatis, stylo crasso 7–11 mm. longo superne glabro.

NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard camp, Idenburg River, alt. 850 m., *Brass* 13287 (TYPE), Mar. 1939 (tree 18–20 m. high, with umbrella crown, occasional in seral rain-forest on sandy flood-banks of river; flowers green); 15 km. southwest of Bernhard Camp, alt. 1770 m., *Brass & Versteegh* 11939 (tree 25 m. high, occasional in forests of slopes; trunk 50 cm. diam.; crown not wide-spreading; bark 18 mm. thick, black, fairly smooth; sap-wood white; heart-wood brown-green; flower-buds green).

Elaeocarpus chloranthus is probably most closely related to *E. terminalioides* Schlechter, differing in its glabrous and obtuse or rounded rather than short-acuminate leaf-blades, its shorter and more compact inflorescences, its much larger petals with acute rather than obtuse and somewhat dilated segments, and its longer stamens.

Elaeocarpus (§ *Ganitrus*) *orohensis* Schlechter in Bot. Jahrb. 54: 130. 1916.

NETHERLANDS NEW GUINEA: Valley of Oroh River, alt. 1300 m., *Pulle* 1133 (TYPE COLL.), Feb. 24, 1913.

This is one of the species which Schlechter described very briefly, referring to a number of Nova Guinea which has not been published. Since he gives a few notes and dimensions, however, the species must be considered validly published. The exact locality is in doubt, "Oroh" being taken from a hand-written label and probably not accurate; the specimen was collected in the region south of Mt. Wilhelmina.

Schlechter's examination of the specimen must have been superficial, for he refers it to § *Blepharoceras*, a section characterized by having trilocular ovaries with the locules at least 6-ovulate. *Pulle 1133* has the locules 4-ovulate and either 4 or 5 in number; 4- and 5-locular ovaries occur about equally in the several flowers I have dissected. The species is clearly a member of § *Ganitrus*, in which it is probably related to *E. cuneifolius* Schlechter. The leaf-blades of *E. orohensis* are peculiarly rugulose on both surfaces with scattered elevations having the appearance of blisters. Because of the inadequacy of the original publication, I here redescribe the species.

Arbor ad 20 m. alta (ex Schlechter), ramulis teretibus brunneis juvenilibus puberulis mox glabris; petiolis supra complanatis mox glabratissimis 1-1.5 cm. longis; laminis chartaceis utrinque glabris et disperse rugulosis, siccitate viridi-olivaceis, obovato-ellipticis, 12-15 cm. longis, 5-7.5 cm. latis, basi et apice obtusis, margine anguste recurvato inconspicue crenato-serratis (dentibus circiter 2 per centimetrum), costa supra elevata interdum canaliculata subtus prominente, nervis lateralibus utrinsecus 7-10 arcuatis utrinque elevatis, rete venularum copioso intricato utrinque valde prominulo; racemis axillaribus vel infra folia orientibus subrectis 10-15 (ad 20 ex Schlechter) cm. longis, pedunculo brevi et rhachi striata circiter 1.5 mm. diametro pedicellisque minute puberulis; floribus numerosis, pedicellis gracilibus sub anthesi 6-10 mm. longis, alabastris angustis 4-5 mm. longis; sepalis papyraceis acutis deltoideo-lanceolatis, 4-5 mm. longis, circiter 1.5 mm. latis, utrinque puberulis, intus glabratissimis; petalis membranaceis e basi angustata cuneatis, 5.5-6 mm. longis, 3-4 mm. latis, margine inferne puberulis ceterum glabris, in segmenta 25-30 linearia acuta irregularia circiter 2 mm. longa profunde fimbriatis; disco annulari-pulvinato circiter 0.5 mm. alto minute velutino-puberulo, lobis 5 oblongis confluentibus; staminibus 15-17 erectis 2.5-3 mm. longis ubique obscure setuloso-puberulis, filamentis brevibus gracilibus, antheris circiter 2 mm. longis apice acutis et minute hispidulis; ovario pallide sericeo 4- vel 5-loculari, loculis 4-ovulatis, stylo subulato circiter 4 mm. longo basim versus sericeo superne glabro.

Elaeocarpus (§ *Ganitrus*) *leptopus* sp. nov.

Arbor ubique partibus juvenilibus puberulis inflorescentisque exceptis glabra, ramulis gracilibus subteretibus vel primo leviter angulatis; petiolis gracilibus 15-18 mm. longis supra complanatis et obscure sericeo-puberulis; laminis chartaceis in sicco fusco-olivaceis ellipticis, 8-11 cm. longis, 3-4.5 cm. latis, basi obtusis et in petiolum decurrentibus, in apicem brevem obtusum vel minute emarginatum cuspidatis, margine inconspicue crenato-serrulatis (dentibus 2-4 per centimetrum), supra nitidis, costa supra leviter subtus valde prominente, nervis lateralibus utrinsecus 8-12 patentibus anastomosantibus utrinque valde prominulis subtus in axillis saepe domatiiferis, rete venularum utrinque prominulis; racemis e ramulis infra folia ortis

sub anthesi 10–20 cm. longis multifloris, pedunculo brevi et rhachi gracili striata 0.5–1 mm. diametro pedicellis sparse puberulis mox glabris, pedicellis gracillimis sub anthesi 5–8 mm. longis; sepalis submembranaceis deltoideo-lanceolatis acutis, circiter 3.5 mm. longis et 1 mm. latis, extus sparse puberulis glabris, intus glabris; petalis membranaceis obovato-cuneatis, circiter 4.5 mm. longis, 2.5–3 mm. latis, margine medium versus ciliolatis ceterum glabris, in lacinias 15–17 inaequales 1–2 mm. longas lineares obtusas fissis; disco annulari-pulvinato indistincte 5-lobato circiter 0.4 mm. alto minute hispidulo; staminibus circiter 15 erectis 2–2.8 mm. longis, filamentis gracilibus ad 1 mm. longis, antheris 1.5–1.8 mm. longis apice obtusis et setas 1–3 breves gerentibus; ovario subgloboso obscure hispidulo-sericeo 4- vel 5-loculari, loculis 4-ovulatis, stylo subulato glabro 2–2.5 mm. longo.

NORTHEASTERN NEW GUINEA: Morobe District, Sattelberg, alt. about 1000 m., *Clemens 2022* (TYPE), Mar. 12, 1936.

Although clearly a member of § *Ganitrus*, *E. leptopus* has flowers unusually small for the section. They approach those of *E. orohensis* Schlechter in size and shape of parts, but they are even smaller and have the petals less copiously laciniate. The rhachises and pedicels of the new species are much more slender than those of *E. orohensis*, while the leaves are smaller and different in shape and texture. Like *E. orohensis*, *E. leptopus* has its ovaries either 4- or 5-locular.

Elaeocarpus (§ *Ganitrus*) *savannarum* sp. nov.

Arbor ad 7 m. alta, ramulis juvenilibus angulatis sericeo-puberulis mox subteretibus glabratissque; petiolis gracilibus 8–15 mm. longis ut ramulis puberulis glabris supra complanatis; laminis chartaceis fusco-viridibus oblongo-ellipticis, 7–11 cm. longis, 2–4 cm. latis, basim versus attenuatis et in petiolum decurrentibus, apice breviter et obtuse cuspidatis, margine inconspicue crenulato-serrulatis (dentibus 3–5 per centimetrum), costa supra saepe subplana subtus prominente, nervis lateralibus utrinsecus 6–10 adscendentibus supra leviter subtus valde prominulis et in axillis interdum domatiiferis, rete venularum utrinque prominulo vel supra subimmerso; racemis axillaribus sub anthesi 7–12 cm. longis multifloris, pedunculo brevi et rhachi striata circiter 0.5 mm. diametro pedicellis arcte puberulis, pedicellis gracilibus sub anthesi 5–6 mm. longis; sepalis papyraceis deltoideo-lanceolatis acutis, circiter 3 mm. longis et 1 mm. latis, utrinque minute puberulis et glabris; petalis membranaceis obovato-cuneatis, circiter 4 mm. longis, 2–2.5 mm. latis, praeter marginem medium versus puberulum ubique glabris, in lacinias 13–17 inaequales lineari-lanceolatas 1–2 mm. longas apice obtusas et paullo incrassatas fissis; disco annulari-pulvinato 5-lobato circiter 0.5 mm. alto minute hispidulo; staminibus 12 vel 13 uniseriatis 1.5–1.8 mm. longis, filamentis gracilibus brevibus, antheris 1.2–1.3 mm. longis apice obtusis et setas 1–3 circiter 0.5 mm. longas gerentibus; ovario subgloboso minute hispidulo 4-loculari, loculis 4-ovulatis, stylo subulato glabro circiter 2 mm. longo.

NETHERLANDS NEW GUINEA: Vicinity of Hollandia, alt. 20–100 m., *Brass 8814* (TYPE), June 14, 1938 (tree 6–7 m. high, common in small forest clumps on secondary savannas; flowers white).

Like the preceding new species (*E. leptopus*), *E. savannarum* has un-

usually small flowers for § *Ganitrus*, and in this species the ovaries are apparently uniformly 4-locular. *Elaeocarpus savannarum* has the sepals, petals, and anthers slightly smaller than those of *E. leptopus*, while its racemes are shorter and its leaf-blades are duller, with more ascending secondaries and less obvious veinlet-reticulation. The two species are very closely allied.

Elaeocarpus (§ *Ganitrus*) *fauroensis* Hemsl. in Kew Bull. 1896: 159. 1896; Schlechter in Bot. Jahrb. 54: 143. 1916.

SOLOMON ISLANDS: Bougainville: Kugumaru, Buin, alt. 150 m., *Kajewski* 1900 (tree to 25 m. high, common in rain-forest; fruit blue; wood used for house-building by natives; native name: *ou-kari-pe*); Guadalcanal: Uulolo, Tutuve Mt., alt. 1200 m., *Kajewski* 2495 (tree up to 30 m. high, common in rain-forest; trunk straight; fruit purple, eaten by cockatoos and pigeons; native name: *hy-cundi*).

Hemsley's brief description of the type specimen, collected on Fauro Island, applies very well to the above-cited specimens, both of which, like the type, are in fruit. The leaf-blades of the *Kajewski* specimens are mostly slightly smaller than those described by Hemsley, averaging about 15×4.5 cm., but some of them attain the dimensions of 18×5.5 cm., very close to the $7-8 \times 2-2.5$ inches stated in the original description. The available fruits are subglobose-ellipsoid, 2-3 cm. in diameter, with a comparatively thick and hard rugulose epicarp (often 1 mm. thick). The endocarp is very hard and bony, with numerous irregular processes 2-4 mm. long. The locules are 5, but sometimes all except 1 or 2 are small and empty. The seeds are dark brown and glossy, about 1 cm. long, and acute at both ends.

Schlechter saw no material of this species and did not attempt to place it. The characters of the foliage and fruit are unmistakably those of § *Ganitrus*, but without flowers I cannot indicate the immediate alliance of the plant.

Elaeocarpus (§ *Ganitrus*) *breviracemosus* Knuth in Rep. Sp. Nov. 48: 73. 1940.

BRITISH NEW GUINEA: Middle Fly River, Lake Daviumbu, *Brass* 7654 (TYPE COLL.) (spur-buttressed canopy tree, common in rain-forest; bark brown, thin, marked with shallow longitudinal fissures; fruit blue).

The fruits of this species, not described by Knuth, are borne on slender spreading racemes up to 9 cm. long, arising from the older parts of branchlets. The pedicels are 15-18 mm. long and fairly thick. The fruits are subglobose, about 2 cm. in diameter, with a smooth hard epicarp about 0.5 mm. thick and a somewhat fibrous mesocarp about 2 mm. thick. The endocarp is hard and bony, irregularly rugulose but without conspicuous processes; the locules are 5, each 1-seeded, but it is likely that sometimes fewer locules are fertile.

The species is unmistakably a member of § *Ganitrus*, but it cannot be more definitely placed without flowers.

5. § FISSIPETALUM

Elaeocarpus § *Fissipetalum* Schlechter in Bot. Jahrb. 54: 118. 1916.

Schlechter originally based this section on five species, among which *E. arjakensis* Schlechter (inadequately described) is anomalous because of its

densely tomentellous lower leaf-surface. The remaining four species have glabrous leaves. The only species illustrated is *E. polydactylus* Schlechter, and this obviously has all the characters which Schlechter intended to apply to the section. Therefore it seems advisable to designate *E. polydactylus* as the lectotype of § *Fissipetalum*.

Since Schlechter's work, several other species have been described which may be referred to § *Fissipetalum*: *E. Pulleanus* O. C. Schmidt, *E. azaleifolius* Knuth, and *E. Brassii* Knuth. These species are discussed below, and under the discussion of *E. azaleifolius* I also suggest that *E. crenulatus* Knuth may belong to this section. From the description, it seems probable that *E. kochbrensis* Gibbs also belongs to § *Fissipetalum*, in which case its alliance may be with *E. Pulleanus* and its relatives or possibly with *E. arjakensis*. This latter species and two relatives described below as new differ from the remaining species of § *Fissipetalum* in the close tomentellous indument of their lower leaf-surfaces and inflorescences. In habit, they thus suggest certain species of § *Blepharoceras* (*E. latescens* F. v. Muell. and its allies, discussed below), but in essential floral characters *E. arjakensis* and its relatives appear to belong in § *Fissipetalum*.

To the eight or ten species which thus already constitute § *Fissipetalum*, I herewith add seven new species below. The section is fairly coherent, in spite of a great range of variation in leaf-size, as indicated by the extremes of *E. myrtoides* and *E. decorus*, both proposed as new. Its diagnostic characters are as follows: inflorescence slender, axillary, associated with the leaves (at least at anthesis), ascending; flowers small, the petals up to 6 mm. long, more or less equally 5-36-fimbriate in the distal half or third, usually essentially glabrous; stamens 10-30, erostrate but often apiculate or hispid-setulose at apex; ovary sericeous, puberulent, or glabrous, 2- or 3-locular, each locule 4-ovulate (occasionally 2-ovulate in *E. roseo-albus* and 6-ovulate in *E. polydactylus*, both discussed below); fruit globose to ellipsoid, comparatively thick-walled, usually unilocular at maturity, the endocarp rugulose or sulcate or pitted but not conspicuously ornamented (except in *E. sericoloides*, an aberrant new species with ornamented endocarp, discussed below).

Elaeocarpus (§ *Fissipetalum*) *roseo-albus* Schlechter in Bot. Jahrb. 54: 119. 1916.

NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, alt. 1800 m., *Brass* 12015 (slender subsidiary tree 12-15 m. high, frequent in mossy-forest; leaves convex; calyx red; petals white).

The cited collection is referred to *E. roseo-albus* with reasonable certainty, in spite of minor differences in dimensions, etc. The type of the species was obtained in the Sepik region of Northeastern New Guinea at 2070 m. The most striking difference between the *Brass* plant and Schlechter's description lies in the fact that the ovules are predominantly two in each of the three locules in our specimen; occasionally the ovules are three, and rarely four. Four is the only number mentioned in the original description, and indeed this number of ovules was considered uniform for § *Fissipetalum* by Schlechter. However, it is obvious that *Brass* 12015 cannot belong to any of Schlechter's first three sections, in which paired

ovules are universal; just as obviously, § *Fissipetalum* is the proper place for this collection, and therefore one must assume that the number of ovules is more variable than indicated by Schlechter.

The leaf-blades of *Brass 12015* sometimes attain the dimensions of 5.5×2.5 cm., but as a rule they approximate the size of 5×1.5 cm. indicated for *E. roseo-albus*. The petals of our collection, fully mature, measure about 3×1.5 mm. and are 9–11-laciniate; the disk is 5-lobed with each lobe slightly grooved; the stamens are 12–14, with anthers 0.8–1 mm. long and obscurely setulose at apex; the flowers are very rarely 4-merous. These slight variations, as compared with Schlechter's description, indicate the only points in which our plant differs from his. The fruits of *Brass 12015*, which may not be fully mature, are ellipsoid, up to 8×5 mm., with a pericarp about 1.5 mm. thick and a single seed. The epicarp is thin and rugulose when dry; the endocarp is thick and woody, with longitudinal grooves.

***Elaeocarpus* (§ *Fissipetalum*) *myrtoides* sp. nov.**

Arbor 5–6 m. alta multiramosa dense foliata, ramis ramulisque subteretibus glabris cinereis copiose et conspicue verrucoso-lenticellatis, ramulis hornotinis rubris gracillimis; petiolis gracilibus canaliculatis 1–3 mm. longis; laminis parvis coriaceis saepe convexis obovato-ellipticis, 10–20 mm. longis, 5–8 mm. latis, basi gradatim angustatis et in petiolum decurrentibus, apice obtusis vel rotundatis, margine utrinsecus dentibus 3–5 crenulato-serratis, utrinque glabris (juventute sericeo-puberulis), costa supra impressa subtus prominente, nervis lateralibus utrinsecus plerumque 3 adscendentibus et rete venularum subtus prominulis; racemis axillaribus 1–2 cm. longis paucifloris, rhachi gracili glabra leviter angulata, pedicellis 6–8 mm. longis obscure sericeis vel glabris; sepalis papyraceis acutis oblongo-lanceolatis, circiter 4×1.5 mm., extus inconspicue pallido-sericeis, intus glabris et carinatis; petalis submembranaceis obovato-oblongis circiter 4×1.5 mm., extus copiose sericeis, intus glabris, apice in segmenta circiter 6 subaequalia 0.6–1 mm. longa obtusa dissectis; disci lobis 5 late oblongis circiter 0.5 mm. altis, superne hispidulis; staminibus circiter 15 erectis 2.8–3 mm. longis, filamentis gracilibus glabris, antheris 1.7–2 mm. longis apice acutis et obscure hispidulis; ovario glabro biloculari, loculis 4-ovulatis, stylo brevi; fructibus ovoideo-ellipsoideis ad 10×6 mm. (immaturis?), basi rotundatis, apice obtusis et basi styli subpersistente coronatis, pericarpio (epicarpio ruguloso et endocarpio osseo inclusis) 1.5–2 mm. crasso, semine solitario.

BRITISH NEW GUINEA: Central Division, Murray Pass, Wharton Range, alt. 2840 m., *Brass 4505* (A, NY, TYPE), July 15, 1933 (much-branched shapely tree 5–6 m. high, common in forests; branchlets, petioles, leaf-margins, rachises, and pedicels red; leaf-blades with nerves impressed above; sepals yellow-brown; petals pale yellow; fruit olive-green).

Elaeocarpus myrtoides is clearly distinguished by its very small leaves, much smaller than those of any other species of § *Fissipetalum*. Its petals, with few and short teeth, suggest those of *E. roseo-albus* Schlechter but are larger. The glabrous bilocular ovary and the very short few-flowered inflorescences further distinguish the new species from its close relatives.

Elaeocarpus (§ *Fissipetalum*) *polydactylus* Schlechter in Bot. Jahrb. 54: 119. fig. 6. 1916.

NORTHEASTERN NEW GUINEA: Morobe District, Yunzaing, alt. 1650 m., *Clemens* 3731; Busu, alt. 1800–2400 m., *Clemens* 6275.

The cited specimens appear to fall into a reasonable concept of Schlechter's species, although the leaf-blades are sometimes larger (up to 7.5×2.5 cm.) than those originally described, while the petals at maturity are larger (up to 5 mm. long) and only 10- or 11-lacinate (rather than 12–15-lacinate). Otherwise our specimens agree precisely with the description and illustration. Schlechter has described a var. *podocarpoides* with leaf-blades up to 12×4 cm. Both the species and the variety are based on material from the Sepik region, at elevations of 1000–1350 m.

Clemens 3731 may have the locules either 4- or 6-ovulate, both conditions having been observed in a single flower. Therefore the 4-ovulate characterization of § *Fissipetalum* must be modified to permit the inclusion of occasional plants with 6-ovulate ovary-locules.

Elaeocarpus (§ *Fissipetalum*) *azaleifolius* Knuth in Rep. Sp. Nov. 48: 72. 1940.

BRITISH NEW GUINEA: Central Division, Mt. Tafa, alt. 2400 m., *Brass* 5002 (A, NY) (tree 12–13 m. high, uncommon in ridge-crest forests; crown flat, spreading, thinly foliated; branchlets, petioles, leaf-costas, and rhachises reddish; flowers cream-colored; fruits blue-green).

The cited specimens precisely agree with the original description of *E. azaleifolius*, reported from the nearby Mt. Victoria at 2300 m. The ovary, not described in detail by Knuth, is 3-locular, with 4 ovules in each locule. Although the leaf-blades of the *Brass* specimen average in size, as those of Mt. Victoria material, about 3.5×1.3 cm., some of them attain a size of 5×2.2 cm. The fruits of *Brass* 5002 are ellipsoid, up to 12×10 mm., with a pericarp about 3 mm. thick and a single seed. The endocarp is hard and woody, with narrow grooves. *Elaeocarpus azaleifolius* is a very close relative of *E. polydactylus* Schlechter, differing principally in its more obtuse and more obscurely crenate leaf-blades, shorter pedicels, and larger sepals and petals.

It seems probable that *E. crenulatus* Knuth (in Rep. Sp. Nov. 48: 74. 1940) also belongs in § *Fissipetalum*; it is based on a sterile specimen also from Mt. Victoria. According to the description, the leaves differ from those of *E. azaleifolius* only in having slightly longer petioles and broader blades.

Elaeocarpus (§ *Fissipetalum*) *mundulus* sp. nov.

Arbor 12 m. alta partibus juvenilibus inflorescentisque exceptis glabra, ramulis teretibus gracilibus cinereis; petiolis leviter canaliculatis gracilibus 4–10 mm. longis; laminis coriaceis saepe convexis anguste obovato-ellipticis, (3–) 4.5–6 cm. longis, (1–) 1.5–2.5 cm. latis, basi attenuatis et in petiolum decurrentibus, apice obtusis vel rotundatis, margine recurvato obscure crenulato-serratis (dentibus 2 vel 3 per centimetrum), costa supra paullo subtus valde elevata, nervis lateralibus utrinsecus 4–7 brevibus adscendentibus et rete venularum copioso utrinque prominulis; racemis axillaribus erectis 4–9.5 cm. longis multifloris, pedunculo brevi et rhachi angulata minute sericeo-puberulis, floribus subconfertis saepe secundis, pedicellis gra-

cilibus 3–5 mm. longis glabris; sepalis papyraceis deltoideo-lanceolatis circiter 4.5×1.5 mm. acutis, extus sparse puberulo-sericeis, intus glabris; petalis submembranaceis ex ungue parvo obovato-cuneatis, 5–6 mm. longis, 2–3 mm. latis, in segmenta 11–13 lineari-lanceolata obtusa 1.5–2.5 mm. longa irregulariter dissectis, margine basim versus minute puberulis, ceterum glabris; disco annulari-pulvinato circiter 0.5 mm. alto superne hirsutulo, lobis 5 oblongis confluentibus; staminibus 17–20 erectis 2–2.8 mm. longis, filamentis gracilibus glabris, antheris 1.5–1.8 mm. longis apice obtuso obscure hirtellis; ovario breviter sericeo 3-loculari, loculis 4-ovulatis, stylo subulato 3.5–4 mm. longo glabro; fructibus (unico viso) globoso-ellipsoideis ad 11×9 mm., pericarpio crasso, epicarpio ruguloso.

NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. about 2800 m., *Brass & Versteegh 10496* (TYPE), Nov. 1, 1938 (tree 12 m. high, frequent in mossy-forest; trunk 27 cm. diam.; crown small; bark 6 mm. thick, dark brown, fairly rough; flowers white).

Elaeocarpus mundulus is most closely allied to *E. azaleifolius* Knuth, from which it differs in its longer petioles and longer and proportionately narrower leaf-blades, which are somewhat thicker in texture, more convex, and with less obvious crenulations. The flowers of the two species are very similar, those of *E. mundulus* being slightly the larger in sepals and petals.

Elaeocarpus (§ *Fissipetalum*) *Brassii* Knuth in Rep. Sp. Nov. 43: 73. 1940.

BRITISH NEW GUINEA: Western Division, Middle Fly River, Lake Daviumbu, *Brass 7450* (TYPE COLL.) (tree 10 m. high, common on small pieces of dry ground in marshes; flowers cream-colored), *Brass 7566* (tree to 25 m. high, plentiful in thin fringing forests of drier lake-shores; stem deeply fluted, covered with gray lenticellate bark; flowers cream-colored); Wuroi, Oriomo River, alt. 30 m., *Brass 5802* (A, NY) (tree 10 m. high, in small isolated forest patch on savanna; foliage pale, shining; fruit bright blue).

The species is clearly a member of § *Fissipetalum*, related to *E. polydactylus* Schlechter; its two ovary-locules contain four ovules each. *Brass 7566* has been reported by Knuth as the type collection of an unpublished species, but I fail to find any consequential differences between it and the type of *E. Brassii*, from the same locality. The leaf-blades of no. 7566 are slightly narrower than those of no. 7450 and have more ascending nerves and more obvious crenations, but these appear to be minor individual points; in inflorescence the two plants scarcely differ. *Brass 5802*, a fruiting specimen, precisely matches the type collection in foliage. The fruits are ellipsoid, up to about 15×10 mm. when fresh, with a pericarp 3–4 mm. thick and a solitary seed. The epicarp is bright blue and thin, becoming coarsely wrinkled when dry. The endocarp is hard and somewhat woody, with inconspicuous irregular lobes.

Elaeocarpus (§ *Fissipetalum*) *nubigenus* Schlechter in Bot. Jahrb. 54: 120. 1916.

NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. 2800 m., *Brass 10576* (slender tree 10–15 m. high, common along banks of streams; sepals brown; petals white; unripe fruit green). BRITISH NEW GUINEA: Central Division, Murray Pass, Wharton Range, alt. 2840 m., *Brass 4510* (A, NY), *4540* (A, NY), *4545* (A, NY) (straggling large shrubs or small trees, sometimes up to 13 m. high, often common in forests or more frequently on forest-borders; leaf-blades shining above; branchlets, petioles, leaf-margins and nerves, and rachises red or reddish brown; pedicels and calyx pale greenish yellow or yellow-brown; petals cream-colored; fruit blue).

The cited specimens can be referred with reasonable confidence to *E. nubigenus*, based on *Schlechter 18791* from the Bismarck Mts. of North-eastern New Guinea at 2500 m. Naturally a considerable range of dimensions is evident in the several available specimens. The leaf-blades were originally described as $6-8 \times 3.2-5$ cm., and this is about the average size, but our specimens have leaf-blades up to 10×6.2 cm. (*Brass 4510*). Schlechter states that the blades are "subintegra," but ours would be better described as definitely crenate, at first spinulose so, with the crenulations 2 or 3 per centimeter. Our specimens have racemes up to 13 cm. long; the sepals and petals are as described by Schlechter, the latter having 16-18 laciniae. The stamens (lacking in the type collection) are about 13-17 in number, 2-3 mm. long, with short filaments and anthers 1.5-2.3 mm. long and obscurely hispidulous at the blunt apex. The fruits (*Brass 4510* and *10576*) are ellipsoid, up to 18×12 mm. at apparent maturity, with a pericarp 2-3 mm. thick and 1 or 2 seeds; the epicarp is conspicuously rugulose when dry, and the endocarp is thick and irregularly shallowly lobed.

Elaeocarpus (§ *Fissipetalum*) *Pulleanus* O. C. Schmidt in *Nova Guin. Bot.* 14: 154. pl. 16B, f. 1-8. 1924.

NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. 2900 m., *Brass 10640* (tree 5-6 m. high, in disturbed forest on edge of a native rest clearing; leaves stiff, convex; fruit blue).

The cited specimen agrees well with the original description of this species, which is based on a collection from the northern slope of the central range of Netherlands New Guinea at 1450-3260 m. altitude. Schmidt describes the leaf-blades as being $4-5.5 \times 2.6-3.5$ cm., but his plate shows a blade up to 6 cm. long. *Brass 10640* has the leaf-blades 4-8 cm. long and 2.5-4.5 cm. broad. The flowers of our specimen are mostly immature, but they agree well with those described, except that the ovary appears to be 3- rather than 2-locular. The mature fruits accompanying no. *10640* are ellipsoid, up to 17×12 mm., obtuse at base and apiculate at apex. The epicarp is hard and comparatively thick, the mesocarp is sparsely fibrous, and the endocarp is bony, 2-3 mm. thick, and irregularly sulcate; the locule is single and 1-seeded. The species appears to be more closely related to *E. nubigenus* Schlechter than to *E. polydactylus* Schlechter, as suggested by Schmidt.

Elaeocarpus (§ *Fissipetalum*) *Archboldianus* sp. nov.

Arbor ad 19 m. alta, ramulis crassis apicem versus ad 5 mm. diametro valde angulatis strigoso-puberulis, mox glabratis, ramulis vetustioribus subteretibus cinereis; petiolis rugulosis crassis canaliculatis cito glabratis 8-17 mm. longis; laminis subcoriaceis in sicco olivaceis obovato- vel elliptico-oblongis, 7-13.5 cm. longis, 2.5-6.5 cm. latis, basi subacutis et in petiolum decurrentibus, apice obtuse cuspidatis vel rotundatis, margine anguste recurvatis et crenulato-serratis (dentibus 3 vel 4 per centimetrum), supra glabris nitidisque, subtus brunneo-punctatis et costa nervisque primo saepe strigoso-hirtellis cito glabratis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 6-12 erecto-patentibus anastomosantibus

supra prominulis subtus valde elevatis et in axillis saepe domatiiferis, rete venularum copiose intricato supra paullo subtus valde prominulo; racemis axillaribus 11–18 cm. longis erectis multifloris, pedunculo brevi et rhachi leviter angulata 1–2 mm. diametro pedicellisue dense tomentello-puberulis demum glabratiss, pedicellis saepe curvatis sub anthesi 5–8 mm. longis; sepalis papyraceis acutis deltoideo-lanceolatis, 4.5–5.5 mm. longis, 1.5–1.8 mm. latis, extus breviter sericeis, intus obscure puberulis glabratiss carinatis; petalis membranaceis basim versus carnosio-incrassatis, obovato-cuneatis, 5–6 mm. longis, 2–3 mm. latis, apice rotundatis et in lacinias 18–36 lineares obtusas 1–2 mm. longas irregulariter fissis, praeter marginem medium versus tomentello-ciliolatum glabris; disco carnosio annulari-pulvinato 5-lobato circiter 0.8 mm. alto minute hispidulo; staminibus 25–30 erectis 2.5–3 mm. longis, antheris 1.7–2.3 mm. longis apice obtusis et setas 1–3 ad 0.2 mm. longas gerentibus vel ebarbellatis; ovario conico-ellipsoideo 3-loculari et styli basi breviter sericeis, loculis 4-ovulatis, stylo subulato 2.5–3 mm. longo; rhachi pedicellisue sub fructu valde incrassatis, fructibus ellipsoideis ad 20 mm. longis et 11 mm. latis, basi obtusis, apice cuspidatis, epicarpio duro crasso, mesocarpio subnullo, endocarpio 2–4 mm. crasso osseo extus profunde et irregulariter sulcato, loculo plerumque unico, semine solitario.

NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, alt. 2300 m., *Brass & Versteegh 11127* (TYPE), Nov. 16, 1938 (tree 19 m. high, common in old secondary forest; trunk 38 cm. diam.; crown not wide-spreading; bark 8 mm. thick, black-brown, rough, shallowly fissured; outer wood white; inner wood dark brown; flowers white; fruits green), *Brass 11414* (substage tree 14 m. high, in fagaceous forest; flowers greenish white).

Elaeocarpus Archboldianus is a species of the relationship of *E. nubigenus* Schlechter and *E. Pulleanus* O. C. Schmidt, differing from both in its larger leaf-blades, longer inflorescences, and more copiously lacinate petals, from the former also in its thicker and sometimes pilosulous leaf-blades, and from the latter also in its longer petioles. The petal-segments are 30–36 in the type collection and usually 18–20 in no. 11414, but the plants are otherwise identical.

Elaeocarpus (§ *Fissipetalum*) *decorus* sp. nov.

Arbor, ramulis crassis apicem versus valde angulatis 3–6 mm. diametro, juvenilibus dense brunneo-tomentellis, vetustioribus glabratiss subteretibus cinereis; petiolis crassis supra complanatis 7–15 mm. longis ut ramulis tomentellis demum glabratiss; laminis subcoriaceis siccitate fusco-olivaceis obovato-ellipticis, 10–22 cm. longis, 3.5–8 (–11) cm. latis, basim versus gradatim angustatis et basi in petiolum decurrentibus, apice rotundatis vel late obtusis interdum paullo emarginatis vel minute cuspidatis, margine leviter recurvatis et dentibus 3–6 per centimetrum primo spinuloso-serrulatis demum inconspicue crenulatis, supra costa interdum tomentella excepta glabris et subnitidis, subtus obscure punctatis et praecipue costa nervisque hirtellis demum subglabratiss, costa supra leviter elevata subtus prominente, nervis lateralibus utrinsecus 13–20 erecto-patentibus valde anastomosantibus supra prominulis subtus peracute elevatis, rete venularum copioso utrinque prominulo; racemis axillaribus vel interdum e ramulis infra folia orientibus sub anthesi 14–22 cm. longis multifloris, pedunculo ad 2 cm. longo et rhachi angulata 1–2 mm. diametro pedicellisue arcte tomentellis,

bracteis oblongo-linearibus obtusis 5–7 mm. longis extus puberulis mox caducis, pedicellis gracilibus sub anthesi 5–11 mm. longis; sepalis papyraceis subacutis oblongo-lanceolatis, 3.5–4 mm. longis, 1.2–1.5 mm. latis, extus tomentello-puberulis, intus glabris; petalis membranaceis basim versus paullo incrassatis, anguste oblongo-cuneatis, 5–5.5 mm. longis, 1.7–2.5 mm. latis, praeter marginem medium versus puberulum glabris, in lacinias 10–16 lineares inaequales 1–2 mm. longas obtusas fimbriatis; disco annulari-pulvinato 5-lobato circiter 0.8 mm. alto dense hispidulo; staminibus 14–16 uniseriatis 2.2–3 mm. longis, filamentis gracilibus, antheris 1.7–2 mm. longis apice subacutis et setis 3–6 ad 0.15 mm. longis barbellatis; ovario conico-ellipsoideo 3-loculari et styli basi tomentello-puberulis, loculis 4-ovulatis, stylo subulato circiter 3 mm. longo superne glabro; rhachi pedicellisque sub fructu paullo incrassatis, fructibus ellipsoideis ad 16×13 mm., basi et apice rotundatis, epicarpio duro crasso ruguloso, mesocarpio subnullo, endocarpio osseo 3–4 mm. crasso profunde sulcato, maturitate loculo et semine solitario.

NORTHEASTERN NEW GUINEA: Morobe District, alt. 1200–1800 m.: Yunzaing, *Clemens* 2420 (TYPE), Apr. 23, 1936, 3745; Ogeramngang, *Clemens* 4799 (tree 11 m. high, in forest; fruit blue), 5398; Matap, *Clemens* 11165 (tree, the trunk 20–25 cm. diam.; flower-buds with a dull purplish tinge; petals white); A-mieng, on Yaneng River, tributary of Buso River, *Clemens* 12323 (sepals pink; petals dull white).

The type and no. 12323 bear inflorescences at anthesis, while nos. 3745 and 4799 are in fruit; the remaining collections bear immature inflorescences. Although no. 12323 has broader leaf-blades than the other specimens, there seems no doubt that all are conspecific. It seems that a plant so common in the Morobe District should have been described, but this well-marked species appears to be without a name. From its closest relatives, *E. Pulleanus* O. C. Schmidt and *E. Archboldianus* (above described), it differs in its substantially larger leaf-blades with more numerous secondary nerves, its fewer stamens, and its comparatively broader fruits: the fruits of both *E. Pulleanus* and *E. Archboldianus* are narrower, obtuse at base, and cuspidate or apiculate at apex. *Elaeocarpus decorus* is further differentiated from *E. Pulleanus* by its longer petioles and racemes, and from *E. Archboldianus* by its less copiously lacinate petals.

Elaeocarpus (§ *Fissipetalum*) *arfakensis* Schlechter in Bot. Jahrb. 54: 118. 1916.

This species, based on *Gjellerup* 1198 from the Arfak Mts. of Netherlands New Guinea, was inadequately described, but nevertheless it must be considered validly published because of Schlechter's notes. It is said to differ from the other species of § *Fissipetalum* in its thickly tomentellous lower leaf-surfaces.

Kanehira & *Hatusima* 14031 and 14072, also from the Arfak Mts., are probably correctly referred to *E. arfakensis* by the collectors, although, in the absence of an adequate description and without consultation of an isotype, such identification is open to question.

Elaeocarpus (§ *Fissipetalum*) *alpestris* sp. nov.

Arbor ad 25 m. alta dense foliata, ramulis subteretibus apicem versus 3–5 mm. diametro densissime brunneo-tomentello-velutinis, ramulis vetustioribus demum cinereis glabratisque; petiolis crassis 2–7 mm. longis ut ramulis dense tomentellis; laminis coriaceis in sicco fuscis ellipticis vel

obovato-ellipticis, 2.5–6 cm. longis, 1.7–3.8 cm. latis, basi et apice rotundatis vel late obtusis, margine leviter recurvatis et dentibus 2–5 per centimetrum serrulatis, supra primo cano-sericeis cito glabratis, subtus densissime brunneo-tomentello-velutinis demum interdum subglabratis, costa supra leviter elevata subtus prominente, nervis lateralibus utrinsecus 5–7 erecto-patentibus supra leviter subtus conspicue elevatis, rete venularum utrinque prominulo subtus indumento occuito; racemis axillaribus suberectis angustis 15–20-floris, pedunculo brevi et rhachi subteretibus robustis 4–7 cm. longis cum bracteis pedicellisque ut ramulis densissime tomentellis, bracteis lanceolatis acutis ad 7 mm. longis mox caducis, pedicellis saepe reflexis sub anthesi 3–5 mm. longis; sepalis tenuiter carnosius oblongo-lanceolatis, 3–4.5 mm. longis, 1.2–1.5 mm. latis, acutis, extus dense et arcte tomentellis, intus carinatis et sericeo-puberulis vel glabratis; petalis membranaceis obovato-cuneatis, 3.5–5 mm. longis, 2–2.5 mm. latis, in segmenta 14–20 filiformia obtusa subaequalia circiter 1 mm. longa laciniatis, margine puberulo excepto glabris vel extus basim versus sparse sericeis; disco continuo 5-lobato 0.4–0.6 mm. alto copiose brunneo-hispidulo; staminibus 14–20 circiter 2.5 mm. longis, filamentis gracilibus circiter 0.7 mm. longis glabris, antheris 1.5–1.8 mm. longis ubique obscure hispidulo-papillois apice obtusis et setas 1–3 minutas interdum gerentibus; ovario ovoideo 3-loculari et styli basi copiose brunneo-sericeis, loculis 4-ovulatis, stylo subulato 1.5–2 mm. longo superne glabro; pedicellis sub fructu ad 1 cm. longis; fructibus coriaceis ellipsoideis maturitate ad 18×13 mm., pericarpio 3–4 mm. crasso, epicarpio duro ruguloso, mesocarpio subnullo, endocarpio osseo ruguloso et leviter sulcato, loculo unico, semine solitario.

NETHERLANDS NEW GUINEA: Lake Habbema, alt. 3225 m., *Brass* 9092 (TYPE), Aug. 1938 (densely foliated tree 4–10 m. high, plentiful in closed forest and sometimes in the taller mossy thickets of peat ridges; petals white; mature fruit blue), *Brass & Myer-Drees* 10434 (tree 8 m. high, in forest; trunk 31 cm. diam. [sterile]); 9 km. northeast of Lake Habbema, alt. 2900 m., *Brass & Versteegh* 10460 (tree about 25 m. high, rare in mossy-forest; trunk 45 cm. diam.; crown very small, dark; bark 16 mm. thick, black, rough; outer wood white; inner wood brown; flowers pale yellow).

Among described species, *E. alpestris* is to be compared only with *E. arjakensis* Schlechter, with which it has in common densely tomentellous leaves and inflorescences and a type of flower suggesting § *Fissipetalum*, with 4-ovulate ovary-locules. The only definite statement about the flowers of *E. arjakensis* given by Schlechter indicates that the petals have about 10 segments; those of *E. alpestris* have 14–20 segments. If the Kanehira and Hatusima specimens mentioned above are correctly referred to *E. arjakensis*, that species further differs from *E. alpestris* in its smaller and less obviously toothed leaves with closer tomentum.

Elaeocarpus (§ *Fissipetalum*) *dasysepalus* sp. nov.

Arbor ad 16 m. alta dense foliata, ramis ramulisque subteretibus, ramulis juvenilibus circiter 2.5 mm. diametro densissime brunneo-tomentello-velutinis, ramulis vetustioribus glabratis; foliis confertis, petiolis inconspicuis 1–2 mm. longis ut ramulis tomentellis anguste alatis, laminis coriaceis in sicco fuscis ellipticis, 1.5–3.5 cm. longis, 1–2 cm. latis, basi obtusis et in petiolum decurrentibus, apice rotundatis vel late obtusis, margine dentibus 6–8 per centimetrum obscure spinuloso-serrulatis, supra glabris vel cito glabratis, subtus indumento ferrugineo arcto dense tomentellis, costa supra

leviter subtus valde elevata, nervis lateralibus utrinsecus 6–9 brevibus patentibus supra subplanis subtus elevatis, rete venularum supra immerso subtus prominulo vel indumento occulto; racemis axillaribus sub alabastro 3–4 cm. longis ut videtur circiter 10-floris, rhachi robusta leviter angulata et bracteis pedicellisque densissime tomentellis, bracteis lanceolato-ellipticis circiter 6 mm. longis max caducis, pedicellis visis circiter 2 mm. longis; floribus eis *E. alpestris* similibus, sepalis in alabastro ad 4.5×2 mm., segmentis petalorum circiter 20, staminibus circiter 25, antheris 1.7–2 mm. longis, ovario etiam 3-loculari et loculis 4-ovulatis; inflorescentiis sub fructu valde incrassatis, pedicellis ad 6 mm. longis et diametro; fructibus plerumque solitariis coriaceis obovoideo-ellipsoideis, maturitate ad 5.5×4.8 cm., pericarpio crassissimo, epicarpio tenui ruguloso, mesocarpio 1.5–2 mm. crasso fibroso, endocarpio lignoso 10–12 mm. crasso lacunis parvis hinc inde pervaso extus disperse scrobiculato, loculis 2 (vel interdum 1?), semine in quoque loculo solitario elongato utrinque subacuto.

BRITISH NEW GUINEA: Central Division, Murray Pass, Wharton Range, alt. 2840 m., *Brass* 4742 (A, NY, TYPE), Aug. 7, 1933 (tree up to 16 m. high, with straight bole and dense crown; one of the principal trees in range-top forests; leaf-blades smooth and bluish green above, brown-pubescent beneath; fruits usually solitary, erect on thick stiff peduncles, bluish green, the putamen hard and pitted; native name: *oriso* [Kuama dialect]).

Elaeocarpus dasycarpus is closely allied to *E. alpestris* (described above), from which it differs in its subsessile leaf-blades, which are smaller, more finely and copiously serrulate, more closely tomentellous beneath, and with more immersed venation. Although only immature inflorescences of *E. dasycarpus* have been seen, it is probable that they will prove to be shorter and with fewer flowers than those of *E. alpestris*, while the sepals appear to be slightly broader and the stamens more numerous. Apparently mature fruits of both species are available, those of *E. dasycarpus* being much the larger and with a very thick hard pitted endocarp.

From *E. arjakensis* Schlechter, the new species differs in its more copiously fimbriate petals and doubtless in other characters, an analysis of which must await examination of the type of *E. arjakensis*.

Elaeocarpus (§ *Fissipetalum*) *sericoloides* sp. nov.

Arbor ad 30 m. alta, ramulis subteretibus fuscis juventute puberulis demum glabris; foliis saepe oppositis vel suboppositis, interdum alternantibus, petiolis gracilibus canaliculatis puberulis 1–3 mm. longis, laminis chartaceis glabris (vel costa substrigosis) ovato-ellipticis, 4–7 cm. longis, 1.5–3 cm. latis, basi rotundatis vel late obtusis, ad apicem obtusum gradatim acuminatis, margine inconspicue crenulato-serratis (dentibus 2–4 per centimetrum), costa supra leviter subtus valde elevata, nervis lateralibus utrinsecus 5–8 patentibus anastomosantibus et rete venularum intricato utrinque prominulis; racemis axillaribus sub anthesi 2–4 cm. longis, pedunculo brevi et rhachi gracili pedicellisque minute cano-puberulis, floribus bracteis membranaceis lanceolatis caducis 2–3 mm. longis subtentis, pedicellis gracillimis sub anthesi 3–8 mm. longis; sepalis membranaceis glabris ovato-deltoides, 3.5–4 mm. longis, circiter 1.7 mm. latis, acutis; petalis membranaceis glabris obovato-cuneatis, 3.5–4 mm. longis, circiter 1.5 mm. latis, dimidio superiore segmentis 10–12 linearibus obtusis regulariter laciniatis; disco continuo annulari-pulvinato circiter 0.5 mm. alto 5-crenulato minute

velutino; staminibus 12 vel 13 erectis 2–2.5 mm. longis, filamentis gracilibus minute setulosis glabratissimis, antheris circiter 1.5 mm. longis ubique minute setulosis apice obscure mucronulatis; ovario glabro subgloboso 3-loculari, loculis 4-ovulatis, stylo subulato circiter 1.5 mm. longo; fructibus globosis 25–32 mm. diametro, epicarpio tenui fragili, mesocarpio ut videtur carnoso, endocarpio duro crasso lignoso processibus numerosis irregularibus 4–8 mm. longis profunde lobato, semine parvo solitario.

NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, alt. 1000–1230 m., Brass & Versteegh 12558 (TYPE), Feb. 22, 1939, 13110 (trees 30 m. high, rare in primary forest, on the slope of a ridge [12558] or along a small stream [13110]; crown not wide-spreading; bark 8 mm. thick, gray or brown, fairly smooth or fairly rough; wood white; flowers white).

At first glance this plant may be taken for a species of *Sericolea*, because of the predominantly opposite or subopposite leaves and the narrow small-flowered racemes. However, the continuous disk and the lacinate petals preclude this disposition, while the fruit is clearly of *Elaeocarpus*. This species demonstrates that *Elaeocarpus* may include species with opposite leaves, a fact that does not greatly weaken the status of *Sericolea*, which is well-characterized by its disk, petals, and fruit. The new species is placed in § *Fissipetalum* with hesitation, its fruit, with unusually long and irregular endocarpic processes, being quite different from that of other species of the section. The floral characters are excellent for § *Fissipetalum* and in this respect *E. sericoloides* is suggestive of *E. polydactylus* Schlechter, *E. azaleifolius* Knuth, and their allies, differing in obvious foliage characters, its setulose-pubescent anthers, glabrous ovary, etc. It is possible that *E. sericoloides* should be placed alone in an anomalous section.

6. § OREOCARPUS

Elaeocarpus § *Oreocarpus* Schlechter in Bot. Jahrb. 54: 127. 1916.

This small section was founded by Schlechter with five species, but one of these, *E. sterrophyllus* Schlechter, according to the few inadequate notes, has a 5-loculed ovary and is thus aberrant in the section. In the remaining species the ovary is bilocular and they seem correctly placed together; selection of a lectotype must be arbitrary. Since *E. populneus* Schlechter is the only species fully described in his treatment, I suggest taking this as the lectotype of the section.

Since Schlechter's work the following species have been described which are referable to § *Oreocarpus*: *E. sogerensis* Bak. f., *E. de Bruynii* O. C. Schmidt, *E. populneoides* Knuth, and *E. patens* Knuth; the last of these is discussed below as a synonym of *E. viscosus* Warb.

Elaeocarpus (§ *Oreocarpus*) *viscosus* Warb. in Bot. Jahrb. 18: 201. 1893; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 432. 1901; Schlechter in Bot. Jahrb. 54: 127. 1916.

Elaeocarpus patens Knuth in Rep. Sp. Nov. 48: 77. 1940, syn. nov.

NORTHEASTERN NEW GUINEA: Morobe District: Sattelberg, alt. 1050–1200 m., Clemens 1062 (large tree, in forested hills; trunk 30–60 cm. diam.; flower cream-colored); Ogeramang, alt. about 1750 m., Clemens 5149 (type coll. of *E. patens*).

Clemens 1062, a flowering specimen from the type locality, agrees precisely with the description of *E. viscosus* in all respects, including floral

dimensions, except that the sepals are scarcely puberulent without when young and are soon glabrate rather than "... extus appresse sericeo-pubescentibus..." The fruiting specimen cited above, the type collection of *E. patens*, agrees precisely with no. 1062 in vegetative characters. The viscid nature of the young branchlets and inflorescence, emphasized by Warburg and Schlechter, is apparently reflected in dried specimens by the shining surfaces of these parts. Scattered immersed yellow glands are also perceptible on the young branchlets, pedicels, and sepals.

Ridley (in Trans. Linn. Soc. II. Bot. 9: 21. 1916) has reported *E. viscosus* from the southern slopes of Mt. Carstensz, Netherlands New Guinea.

Elaeocarpus (§ *Oreocarpus*) *populneoides* Knuth in Rep. Sp. Nov. 48: 78. 1940.

BRITISH NEW GUINEA: Western Division: Lake Daviumbu, middle Fly River, *Brass* 7865 (TYPE COLL.) (common canopy tree in rain-forest; trunk flanged at base; bark thin, brown, marked with slight horizontal ridges; flowers white, sweet-scented); Tarara, Wassi Kussa River, *Brass* 8705 (tree 8 m. high, in gallery rain-forest; bark close, gray, the inner bark green).

This species, based on the above-cited specimens, was described by Knuth without indication of relationship. Its ovary is glabrous and bilocular, each locule being 10-ovulate; thus it doubtless belongs in § *Oreocarpus*, where it seems closest to *E. populneus* Schlechter, a position doubtless implied by Knuth in his choice of an epithet. Several important details, which are not brought out in the original description, separate *E. populneoides* from Schlechter's species; for instance, the racemes are 7-14-flowered rather than 4-7-flowered, the laciniae of the petals are 25-30 rather than 12-15, and the stamens are about 35 in number rather than about 15.

Elaeocarpus (§ *Oreocarpus*) *culminicola* Warb. in Bot. Jahrb. 16: 23. 1892; K. Schum. & Lauterb. Fl. Deutsch. Schutzgeb. Südsee 432. 1901; Schlechter in Bot. Jahrb. 54: 128. 1916.

NORTHEASTERN NEW GUINEA: Morobe District, Busu, alt. 1800-2400 m., *Clemens* 6269. BRITISH NEW GUINEA: Central Division, Mt. Tafa, alt. 2300-2400 m., *Brass* 4069 (A, NY) (sparsely branched slender shrub about 2 m. high, rare in mossy-forest; leaves glossy, paler beneath; flowers pale pink), *Brass* 4918 (A, NY) (very slender small tree, in dense forest; leaves smooth and shining; flower-buds brown; immature fruit smooth, up to 25 × 15 mm.), *Brass* 5016 (A, NY) (weak bush or slender tree 2-3 m. high, in undergrowth of forest; young growth red; leaf-margins and midribs above very pale; pedicels and calyx brownish pink; petals cream-colored; fruit smooth, blue-green, about 2 cm. long).

The above-cited specimens are referred to *E. culminicola* with reasonable confidence, as they agree with the original description in such essential details as the entire and prominently veined leaf-blades, few-flowered inflorescences, comparatively large flowers, and pilose long-awned stamens. The type collection, from the Finisterre Mts. of Northeastern New Guinea at 2300 m. altitude, consists of sparse and inferior material, according to Schlechter. Therefore it is not surprising that the ample material now available discloses that the specific concept needs amplification. The species appears remarkably variable in the size of its parts; even on the

same specimen the petiole may vary from 8 to 40 mm. in length, the leaf-blades being $8-19 \times 2.5-7$ cm. The dimensions given by Warburg are similar to those of the smaller leaves available to me. The inflorescences are 3-8 cm. long and 5-12-flowered. The pedicels vary from 15 to 35 mm. in length, and mature flowers are larger than those described by Warburg, with sepals $16-19 \times 2-3.5$ mm., petals $17-20 \times 7-10$ mm. and laciniate into 20-26 segments which are 4-6 mm. long, about 25 stamens with filaments 2-2.5 mm. long, and a style 12-13 mm. long. The anther-dimensions given by Warburg are about correct. The ovary is glabrous and 2-locular, each locule being 8-12-ovulate.

7. § BLEPHAROCERAS

Elaeocarpus § *Blepharoceras* Schlechter in Bot. Jahrb. 54: 129. 1916.

In basing § *Blepharoceras* upon three species, Schlechter remarks that its limits are not entirely satisfactory. One of the three original species, *E. orohensis* Schlechter, definitely represents § *Ganitrus*, and as such it has been discussed above. The two remaining species, *E. blepharoceras* Schlechter (the type species of the section) and *E. coloides* Schlechter, are quite different in vegetative characters, but they agree in the fundamental floral characters; as thus delimited the section appears quite recognizable and useful, although perhaps not natural.

Since Schlechter's work two other species have been proposed which are referable to § *Blepharoceras*: *E. ihuensis* O. C. Schmidt and *E. filiformidentatus* Knuth. The first of these certainly belongs here and the second probably, although I have not seen material of it and the description lacks verifying details of the ovary-structure.

A new species related to *E. blepharoceras* is described below, and I also propose to add to § *Blepharoceras* a group of five montane species (*E. latescens* F. v. Muell. and four new species) which differ sharply from other members of the section in having the lower leaf-surfaces and inflorescences densely tomentellous. These five species form a closely knit group which, in Schlechter's system, can be referred only to § *Blepharoceras*, although in appearance the plants do not suggest this section. Actually, they bear a much closer superficial resemblance to certain species of § *Fissipetalum* (*E. arfakensis*, *E. alpestris*, and *E. dasycarpus*, discussed above) than to any species of § *Blepharoceras*, but in floral characters these two groups of tomentellous-leaved species do not seem closely related. If floral characters are to be used as the principal basis of sectional grouping in *Elaeocarpus*, as seems most practical, it thus becomes necessary to place in widely separated sections two species-groups which are vegetatively quite similar. A further relationship should be noted between *E. latescens* and its four close allies on the one hand and certain species of § *Coilopetalum* (e. g. *E. fuscus* Schlechter and *E. fuscooides* Knuth) on the other. These two species have all the characters of § *Coilopetalum* except for their copiously tomentellous leaves and inflorescences, in which they suggest the above-mentioned members of § *Blepharoceras*. The complex inter-relationship of the species of *Elaeocarpus* is here well illustrated.

As now constituted, § *Blepharoceras* consists of ten species, of which five are described as new in the present treatment. The fruits of only four species (*E. tafaensis*, *E. crianthus*, *E. latescens*, and *E. whartoneensis*) of § *Blepharoceras* are thus far known. Although widely divergent in size, these fruits agree in having an unusually dry and strongly fibrous mesocarp. The significance of this as a sectional character is as yet doubtful.

Elaeocarpus (§ *Blepharoceras*) *tafaensis* sp. nov.

Arbor dense foliata ad 25 m. alta, ramulis gracilibus juventute angulatis cano-sericeo-puberulis demum subteretibus cinereis glabratibus; foliis apicem ramulorum versus confertis, petiolis gracilibus supra complanatis dense sericeis glabratibusve (5-) 10-18 mm. longis, laminis subcoriaceis in sicco fuscis obovato-ellipticis, (4-) 6-9 cm. longis, (1.5-) 2-4 cm. latis, basi acutis et in petiolum gradatim decurrentibus, in apicem 2-5 mm. longum abrupte cuspidatis, margine anguste recurvatis et integris vel inconspicue undulato-crenatis, supra praecipue costa nervisque primo sericeis cito glabratibus, subtus dense et persistenter pallido-brunneo-sericeis, costa supra paullo elevata subtus prominente, nervis lateralibus utrinsecus 5-8 adscendentibus supra leviter subtus peracute elevatis, rete venularum intricato supra prominulo subtus indumento occulto; racemis axillaribus patentibus gracilibus laxis sub anthesi 6-9 cm. longis 8-15-floris, pedunculo et rhachi 0.7-1 mm. diametro pedicellisque primo sericeo-puberulis mox glabratibus, bracteis parvis caducis, pedicellis striatis sub anthesi 11-15 mm. longis, alabastris anguste conicis, 8-11 mm. longis, circiter 2 mm. latis, acutis; sepalis submembranaceis lanceolatis, 12-13 mm. longis, basi 2-2.5 mm. latis deinde ad apicem subacutum gradatim angustatis, utrinque minute pallido-sericeis glabratibusque, intus carinatis; petalis membranaceis oblongis, 13-17 mm. longis, 2-3 mm. latis, extus glabris, intus infra medium praecipue margine et carina prominente copiose pallido-tomentellis, in segmenta 15-35 filiformia apice obtusa et paullo incrassata 2-4 mm. longa irregulariter laciniatis; disco annulari-pulvinato 1.2-1.5 mm. alto, irregulariter sulcato, apice crenulato, minute hispidulo; staminibus 15-20 uniseriatis erectis gracilibus 7-9 mm. longis, filamentis glabris 2.5-3 mm. longis, antheris arista copiose hispidula 1-1.5 mm. longa excepta 3.5-4.5 mm. longis obscure sericeis; ovario ellipsoideo 3-loculari et styli basi copiose sericeis, loculis 6 (raro 4-) ovulatis, stylo subulato 11-12 mm. longo superne glabro; rhachi pedicellisque sub fructu incrassatis, fructibus subglobosis 30-42 mm. diametro, epicarpio tenui sublevi, mesocarpio conspicue fibroso 5-10 mm. crasso, endocarpio osseo 1-3 mm. crasso ut videtur sine processibus, loculis 3 vel abortu 1 vel 2.

BRITISH NEW GUINEA: Central Division, Mt. Tafa, alt. 2300-2350 m., *Brass* 4102 (A, TYPE, NY), May 27, 1933 (dense-foliaged tree up to 25 m. high, one of the largest mossy-forest trees; bark dark, furrowed, scaly; wood hard, yellowish; leaf-blades convex, dark green and glossy above, pale brown and shining beneath; peduncles, pedicels, and calyces reddish; petals pale yellow; anthers pale purple; style yellow), *Brass* 5058 (A, NY), Sept. 17, 1933 (dense-foliaged tree 10-15 m. high, common in substage of tall forests; leaf-blades convex, thinly pale-pubescent above, brown-silky-pubescent beneath; pedicels and sepals reddish brown; petals pale green; fruit glaucous-green, apparently not quite mature, up to 42 × 40 mm.).

Elaeocarpus tafaensis appears to be closely related to *E. blepharoceras* Schlechter, from the Sepik region of Northeastern New Guinea at about 1000 m. altitude. As Schlechter's type had only immature flowers, a com-

parison of the two plants cannot be entirely satisfactory, but it seems likely that the new species has substantially larger flowers than *E. blepharoceras*. The pedicels of Schlechter's species, from not wholly mature flowers, are said to be 4 mm. long, and the sepals are 5 mm. long, whereas even the buds of *E. tafaensis* have dimensions exceeding these. The petals of the new species are copiously tomentellous within rather than merely "... marginibus medio barbellata, caeterum subglabra." In foliage, *E. tafaensis* has the leaf-blades obovate rather than elliptic, definitely broadest above the middle, merely cuspidate rather than acuminate at apex, and with the margins essentially entire.

The fact that the ovary-locules of *E. tafaensis* are sometimes 4-ovulate suggests § *Fissipetalum*. However, as now constituted, § *Fissipetalum* has much smaller flowers (petals not exceeding 6 mm. in length), with erostrate anthers. Therefore I place *E. tafaensis* in § *Blepharoceras*, but it should be noted that the line between the two sections is not entirely satisfactory. Both the cited numbers are accompanied by fruits, which are remarkable for their thick and fibrous mesocarp, somewhat similar to that of the fruits of *Aceratium*.

Elaeocarpus (§ *Blepharoceras*) *coloides* Schlechter in Bot. Jahrb. 54: 130. 1916.

NETHERLANDS NEW GUINEA: Northern slope of Gautier Mts., alt. about 400 m., Gjellerup 898 (TYPE COLL.), Nov. 1911.

Elaeocarpus coloides clearly has the floral characters which Schlechter intended to include in his § *Blepharoceras*, although in vegetative characters it is not very suggestive of *E. blepharoceras* Schlechter. The closest ally of *E. coloides* is *E. ihuensis* O. C. Schmidt, as pointed out by Schmidt (in Jour. Arnold Arb. 10: 80. 1929). As Schlechter's original publication of *E. coloides* consists of only a few brief notes, I herewith re-describe the species from an isotype.

Frutex 4 m. altus ubique partibus juvenilibus sparse puberulis et florum partibus exceptis glaber, ramulis subteretibus cinereis apicem versus 3–5 mm. diametro; petiolis rectis leviter canaliculatis 2–3 cm. longis basi et apice incrassatis; laminis chartaceis anguste obovato-ellipticis, 10–17 cm. longis, 4–6 cm. latis, basi obtusis, apice in acuminem ad 1 cm. longum cuspidatis, margine inconspicue et remote serrulato-crenulatis, costa utrinque prominente, nervis lateralibus utrinsecus 9–11 arcuato-adscententibus supra prominulis subtus peracute elevatis, rete venularum intricato utrinque leviter prominulo; racemis gracilibus ad 5 cm. longis circiter 8–12-floris, pedunculo brevi et rhachi gracili pedicellisque obscure puberulis glabris, bracteis oblongis cuspidatis circiter 1 mm. longis, pedicellis sub anthesi 5–7 mm. longis; sepalis subcarnosis lanceolatis, circiter 7 mm. longis et 1.7 mm. latis, subacutis, extus glabris, intus cano-puberulis; petalis membranaceis ubique glabris oblongo-cuneatis, 8–9 mm. longis, 3–4 mm. latis, 3-lobatis, in segmenta 12–17 breves irregulariter laciniatis; disco annulari circiter 0.7 mm. alto superne puberulo; staminibus 25–30 erectis 3.5–3.8 mm. longis, filamentis glabris, antheris ubique setuloso-puberulis circiter 2 mm. longis apiculo brevi (ad 0.3 mm. longo) excepto; ovario sericeo 2-loculari, loculis ut videtur 8-ovulatis, stylo deciduo.

Elaeocarpus (§ *Blepharoceras*) *trichophyllus* sp. nov.

Arbor ad 18 m. alta, ramulis subteretibus, hornotinis 3–5 mm. diametro densissime ferrugineo-tomentellis, annotinis glabratibus cinereis lenticellatis; petiolis robustis (circiter 2 mm. diametro) 1–2 cm. longis subteretibus ut ramulis tomentellis; laminis subcoriaceis in sicco supra viridibus subtus ferrugineis, ellipticis vel obovato-ellipticis, 6–11 cm. longis, 4–7 cm. latis, basi et apice rotundatis vel basi late truncatis, margine dentibus 2–4 per centimetrum obscure spinuloso-serrulatis, supra costa tomentella excepta glabris vel mox glabratibus, subtus densissime et persistenter ferrugineo-tomentellis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 6–11 patentibus in dentibus marginis exeuntibus supra prominulis subtus prominentibus in axillis saepe obscure domatiiferis, rete venularum intricato utrinque leviter prominulo vel subtus indumento occulto; racemis axillaribus suberectis 7–12 cm. longis plerumque 10–18-floris, pedunculo subtereti 1–2 cm. longo et rhachi leviter angulata pedicellisque densissime ferrugineo-tomentellis, pedicellis curvatis sub anthesi 10–15 mm. longis, alabastris ovoideis breviter cuspidatis; sepalis tenuiter carnosius lanceolatis, 8–9 mm. longis, 2.5–3 mm. latis, extus copiose tomentellis, intus breviter sericeis, margine incrassato farinoso-puberulis; petalis membranaceis late obovato-cuneatis, 10–12 mm. longis, 8–10 mm. latis, apice profunde 3–5-lobatis etiam in segmenta 35–45 lanceolata acuta 2–4 mm. longa irregulariter fimbriatis, utrinque copiose sericeis (pilis intus brevioribus); disci lobis 5 reniformi-oblongis copiose hispidis, circiter 1 mm. altis et 2 mm. longis; staminibus circiter 45 erectis 4.5–5.5 mm. longis, filamentis gracilibus 1–1.5 mm. longis glabris vel obscure hispidulis, antheris ubique hispiduloso-papillois arista subulata erecta 1.5–2 mm. longa excepta 2–2.5 mm. longis; ovario ovoideo 2-loculari dense sericeo, loculis 10-ovulatis, stylo subulato glabro circiter 4 mm. longo.

NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, alt. about 2300 m., *Brass & Versteegh 11118* (TYPE), Nov. 14, 1938 (tree about 18 m. high, rare in substage of primary forest; trunk 34 cm. diam.; crown small; bark 5 mm. thick, dark brown, fairly rough; outer wood white; inner wood brown; flowers white).

Elaeocarpus trichophyllus is the first of a group of five montane species with tomentellous lower leaf-surfaces and inflorescences, referred to § *Blepharoceras* because of a similarity of essential floral characters rather than because of any habital resemblance. The complex relationships of this group are discussed above under the sectional name.

Elaeocarpus (§ *Blepharoceras*) *erianthus* sp. nov.

Arbor ad 8 m. alta vel ultra, ramulis subteretibus apicem versus 2.5–4 mm. diametro densissime ferrugineo- vel canescenti-tomentellis demum cinereis glabratibusque; petiolis validis 5–8 mm. longis ut ramulis tomentellis; laminis coriaceis oblongo-ellipticis, 2.5–5 cm. longis, 1.5–4 cm. latis, basi subcordatis vel rotundatis, apice rotundatis vel late obtusis, margine dentibus 5–7 per centimetrum obscure calloso-serrulatis, supra in sicco olivaceis primo puberulis demum costa tomentella excepta glabratibus, subtus densissime ferrugineo- vel demum cano-tomentellis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 6–8 patentibus in dentibus marginis exeuntibus supra immersis vel impressis subtus valde elevatis, rete venularum supra immerso subtus inconspicue prominulo; racemis axillaribus suberectis 4–7 cm. longis circiter 10-floris, pedunculo 1–2.5 cm. longo

et rhachi subteretibus pedicellisque copiose tomentellis, pedicellis curvatis validis 6–9 mm. longis, alabastris ovoideis obtusis; sepalis carnosis acutis ovato-lanceolatis, 7–8 mm. longis, circiter 3 mm. latis, extus dense tomentellis, intus carinatis et breviter sericeis; petalis late obovato-cuneatis, 7–8 mm. longis, 4–6 mm. latis, utrinque dense sericeis, saepe concavis vel margine anguste involutis, apice in segmenta 30–40 lanceolata acuta 1–1.5 mm. longa irregulariter fimbriatis; disci lobis 5 late oblongis circiter 1×2 mm. copiose sericeis; staminibus 40–50 erectis 4–4.5 mm. longis, filamentis gracilibus subteretibus glabris 0.8–1 mm. longis, antheris minute hispidulo-papillosis arista subulata erecta vel reflexa 1.5–1.8 mm. longa excepta 1.7–2 mm. longis; ovario ovoideo 2-loculari dense sericeo-hispidulo, loculis 12-ovulatis, stylo subulato glabro circiter 2 mm. longo; fructibus ovoideis ad 12×9 mm., pericarpio 2–3 mm. crasso, epicarpio tenui ruguloso, mesocarpio conspicue fibroso, endocarpio osseo extus leviter et irregulariter sulcato, loculo unico, semine solitario.

BRITISH NEW GUINEA: Central Division, Murray Pass, Wharton Range, alt. 2840 m., *Brass* 4537 (A, NY) (tree 7–8 m. high, abundant in forests on south side of pass; crown dense, rounded, composed of short stiff branches; leaves very stiff, pale brown beneath; fruit bluish green), *Brass* 4767 (NY, TYPE), Aug. 8, 1933 (large dense-crowned forest tree; only one flowering specimen found).

Elaeocarpus erianthus is closely related to the preceding new species, *E. trichophyllus*, from which it differs in its smaller leaf-blades, which are more finely serrulate and have the secondaries and veinlets immersed rather than prominulous above, its shorter pedicels, and its smaller floral parts. The petals of *E. erianthus* are fimbriate with comparatively short segments and are not divided into lobes, as are those of *E. trichophyllus*.

Elaeocarpus (§ *Blepharoceras*) *eximius* sp. nov.

Arbor ad 30 m. alta, ramulis subteretibus apicem versus 2.5–3 mm. diametro primo cano-tomentellis vel laxo squamulosis mox glabris, annuinis nigrescentibus vel cinereis; petiolis ut ramulis saepe squamulosis mox glabris supra complanatis 1–2.5 cm. longis; laminis coriaceis obovato-ellipticis, (5–) 7–10 cm. longis, (3–) 4–5.5 cm. latis, ad basim obtusum vel subacutum gradatim angustatis, apice rotundatis vel late obtusis, margine dentibus 3 vel 4 per centimetrum minute calloso-serrulatis, supra in sicco olivaceis glabris vel juventute indumento cano-squamuloso-tomentello indutis, subtus dense cano-tomentellis vel -lanatis demum subglabris, costa supra valde elevata subtus prominente, nervis lateralibus utrinsecus 8–13 patentibus in margine exeuntibus supra prominulis subtus valde elevatis, rete venularum utrinque prominulo vel subtus subimmerso; racemis apicem ramulorum versus axillaribus vel in ramulis brevibus 2 vel 3 aggregatis 5–9 cm. longis 8–14-floris, pedunculo brevi et rhachi angulata pedicellisque dense cano-tomentellis, bracteis ovatis acutis ad 4 mm. longis cito caducis, pedicellis curvatis sub anthesi 4–7 mm. longis, alabastris ovoideis obtusis; sepalis carnosis lanceolatis acutis, 8–9 mm. longis, 2–2.5 mm. latis, extus copiose et arcte tomentellis, intus breviter sericeis; petalis submembranaceis vel tenuiter carnosis obovato-cuneatis, 8–9 mm. longis, 3.5–4.5 mm. latis, extus dense sericeis, intus copiose tomentellis, apice in segmenta 10–15 lanceolata acuta 1–3 mm. longa irregulariter fimbriatis; disci lobis 5 carnosis late oblongis circiter 0.8×1.3 mm. dense sericeis; staminibus 30–35 ubique minute hispidulis 4.5–5.5 mm. longis, filamentis

gracilibus subteretibus 2–2.5 mm. longis, antheris arista erecta subulata 1.2–1.5 mm. longa excepta 1.2–1.5 mm. longis; ovario ovoideo 2-loculari et styli basi copiose sericeis, loculis 10-ovulatis, stylo subulato 2.5–3 mm. longo superne glabro; fructibus immaturis ellipsoideis ad 10×8 mm. dense tomentellis demum forsan glabratis, epicarpio ruguloso.

BRITISH NEW GUINEA: Central Division, Mt. Tafa, alt. 2400 m., *Brass* 4954 (A, TYPE, NY), Sept. 2, 1933 (tree to 30 m. high, with rather open crown of pale scurfy foliage, pale slightly scaly bark, and white wood; one of the commonest and most striking trees in the sheltered valley forests; flowers pale brown).

Closely related to the two preceding new species (*E. trichophyllus* and *E. erianthus*), *E. eximius* differs from them in its somewhat canescent and scurfy tomentum, obtuse or subacute leaf-bases, narrower perianth-segments, less copiously fimbriate petals, and longer filaments. In leaf-venation, the new species resembles *E. trichophyllus* more closely than *E. erianthus*.

Elaeocarpus (§ *Blepharoceras*) *latescens* F. v. Muell. in Trans. Roy. Soc. Vict. 1(2): 2. 1889; Schlechter in Bot. Jahrb. 54: 143. 1916.

BRITISH NEW GUINEA: Central Division, Mt. Tafa, alt. 2350–2400 m., *Brass* 4078 (A, NY) (compact small tree or tall shrub of erect branching habit, in small patch of burnt-over mossy-forest; leaf-blades brown beneath; sepals brown; petals paler brown, with whitish tips), *Brass* 4896 (A, NY) (tree 10–15 m. high, with compact rounded crown, common in forests; leaf-blades gray underneath when old, brown in young stages; flowers pale yellow-brown).

Elaeocarpus latescens is based on a collection made by MacGregor on the Musgrave Range, and the original description, although inadequate in detail and lacking dimensions, indicates that a species with the leaf-blades rounded at apex and closely brown-tomentellous beneath is represented. In attempting to match this description among the plants collected by Brass in the nearby Wharton Range and the Mt. Tafa region, I conclude that nos. 4078 and 4896 best represent Mueller's concept. In all essential characters these collections agree with Mueller's description, whereas the species which I describe above as *E. dasycarpus*, *E. erianthus*, and *E. eximius* each have several features which are less well suited to the description. Furthermore, nos. 4078 and 4896 bear a striking resemblance to the plate of *E. coriaceus* (in Hook. Ic. Pl. 2: pl. 154. 1837) which, according to Mueller, "approaches in form of leaves and in several other characteristics to this Papuan subalpine species."

Schlechter saw no material of *E. latescens* and did not attempt to place the species. If correctly interpreted by me, it is clearly related to the three new species described above (*E. trichophyllus*, *E. erianthus*, and *E. eximius*), differing from them in the closer and somewhat farinose tomentum of the lower leaf-surfaces and inflorescences, the smaller floral parts, the fewer stamens with shorter-awned anthers, and the fewer ovules. The following description is based entirely upon the two Brass collections.

Frutex vel arbor ad 15 m. alta, ramulis gracilibus subteretibus apicem versus 1–2 mm. diametro densissime et arcte ferrugineo-tomentellis, annuinis glabratis cinereis; petiolis gracilibus 4–10 mm. longis primo tomentellis cito glabratis; laminis coriaceis obovato-ellipticis, (2–) 3–5 cm. longis, (1.3–) 2–3 cm. latis, basi obtusis vel subacutis, apice rotundatis vel sub-

truncatis, margine dentibus 4–6 per centimetrum obscure callososerrulatis, supra in sicco olivaceis costa interdum tomentella excepta glabris, subtus densissime et arcte ferrugineo-tomentellis, costa supra leviter elevata subtus prominente, nervis lateralibus utrinsecus 4 vel 5 suberectis supra subplanis subtus valde elevatis, rete venularum intricato supra obscure prominulo subtus indumento occulto; racemis axillaribus suberectis 3–9 cm. longis 10–17-floris, pedunculo ad 2 cm. longo demum subglabrato, rhachi gracili et bracteis pedicellisque densissime ferrugineo-tomentellis, bracteis lanceolatis 3–4 mm. longis mox caducis, pedicellis gracilibus curvatis sub anthesi 5–7 mm. longis, alabastris ovoideis obtuse cuspidatis; sepalis papyraceis acutis oblongo-lanceolatis, 4.5–6 mm. longis, 1.3–1.5 mm. latis, extus ut pedicello tomentellis, intus minute sericeis; petalis membranaceis obovato-cuneatis, 5–7 mm. longis, 2.5–3.5 mm. latis, extus dense sericeis, intus sparse sericeis glabratissive, apice in segmenta 12–25 lanceolata acuta 1–2 mm. longa irregulariter fimbriatis; disci lobis 5 subreniformibus vel late oblongis circiter 0.5×0.7 mm. conspicue sericeis interdum bilobatis; staminibus 20–25 ubique obscure hispidulo-papillosis 3–3.5 mm. longis, filamentis gracilibus subteretibus 1.2–1.7 mm. longis, antheris arista inconspicua 0.3–0.5 mm. longa excepta 1–1.3 mm. longis; ovario ovoideo 2-loculari et styli basi copiose brunneo-sericeis, loculis 8-ovulatis, stylo subulato 2–2.5 mm. longo superne glabro; fructibus submaturis ellipsoideis ad 10×8 mm., basi et apice rotundatis, pericarpio 2–3 mm. crasso, epicarpio tenui ruguloso, mesocarpio ad 1 mm. crasso fibroso, endocarpio duro inconspicue sulcato, loculo unico, semine ut videtur solitario.

Elaeocarpus (§ *Blepharoceras*) *whartonensis* sp. nov.

Arbor ad 7 m. alta dense foliata, ramulis teretibus, hornotinis 1.5–2 mm. diametro dense ferrugineo- vel cano-tomentellis, annotinis fusco-cinereis glabratiss; petiolis gracilibus 9–15 mm. longis tomentellis demum glabratiss; laminis coriaceis convexis ovato-ellipticis, (3.5–) 4–7 cm. longis, 2–4 cm. latis, basi late obtusis, apice in acuminem 3–6 mm. longum angustatis, margine recurvatis et dentibus 3–5 per centimetrum callososerrulatis, supra olivaceis mox glabratiss, subtus indumento arcto ferrugineo dense indutis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 7–11 erecto-patentibus in dentibus marginis exeuntibus supra leviter prominulis subtus valde elevatis, rete venularum supra paullo prominulo subtus occulto; racemis axillaribus 2–6 cm. longis 5–10-floris, pedunculo brevi et rhachi gracili pedicellisque arcte ferrugineo-tomentellis, pedicellis curvatis sub anthesi 6–8 mm. longis, alabastris ovoideis obtuse cuspidatis; sepalis tenuiter carnosiss acutis oblongo-lanceolatis, 6–7 mm. longis, 1.5–2.5 mm. latis, extus ut pedicello tomentellis, intus valde carinatis et breviter sericeis; petalis submembranaceis oblongo-cuneatis, 6–7 mm. longis, 2–3 mm. latis, utrinque copiose sericeis, apice in segmenta 10–16 lanceolata acuta circiter 1.5 mm. longa subaequalia laciniatis; disco continuo 5-lobato circiter 0.8 mm. alto dense sericeo; staminibus circiter 25 ubique minute hispidulosiss 3.5–4 mm. longis, filamentis gracilibus subteretibus 1.5–2 mm. longis, antheris arista erecta subulata circiter 0.5 mm. longa excepta 1.3–1.5 mm. longis; ovario 2-loculari et stylo infra medium copiose sericeis, loculis 6-ovulatis, stylo subulato circiter 2.5 mm. longo superne glabro; fructibus submaturis ellipsoideis ad 14×10 mm., basi rotundatis, apice styli basi apiculatis, pericarpio eo *E. latescentis* simili, loculis saepe 2, seminibus in quoque loculo solitariis.

BRITISH NEW GUINEA: Central Division, Murray Pass, Wharton Range, alt. 2840 m., *Brass* 4559 (A, TYPE, NY), July 19, 1933 (dense-foliaged small tree 5-7 m. high, common in forests; leaves convex, stiff, dull green above, pale brown beneath; sepals, pedicels, and rachises dark brown; petals pale brown; fruits green-blue).

Elaeocarpus whartonensis is obviously a close relative of *E. latescens* F. v. Muell., as interpreted above, differing in its longer petioles, ovate- rather than obovate-elliptic leaf-blades which are acuminate rather than rounded or subtruncate at apex and have more numerous secondaries, shorter and fewer-flowered racemes, slightly larger sepals and stamens, proportionately narrower petals which are more regularly fimbriate and densely sericeous rather than glabrate within, and 6- rather than 8-ovulate ovary-locules. Although most of these differences are minor in nature, those pertaining to the leaf-apex, the number of secondary nerves, and the petal-pubesence appear to be of specific consequence.

8. § MONOCERA

Elaeocarpus § *Monocera* Brongn. & Gris in Bull. Soc. Bot. Fr. 8: 201. 1861; Benth. & Hook. f. Gen. Pl. 1: 240. 1862; Mast. in Hook. f. Fl. Brit. Ind. 1: 404. 1874; K. Schum. in E. & P. Nat. Pfl. 3(6): 5. 1890.

Monocera Jack in Malay. Misc. 1(5): 42. 1820 [repr. in Hook. Bot. Misc. 2: 85. 1830; in Calcutta Jour. Nat. Hist. 4: 225. 1843; et in Miscel. Papers Indo-China II. 2: 243. 1887].

Elaeocarpus § *Papuanthus* Schlechter in Bot. Jahrb. 54: 130. 1916.

Elaeocarpus § *Monocera* has been very broadly interpreted by most recent students, to such an extent that its true characters and limitations have been overlooked; doubtless for this reason Schlechter did not attempt to correlate the name with any group of Papuanian *Elaeocarpi*. However, the section is easily typified, since it rests solely upon the genus *Monocera* Jack. The original publication of *Monocera* states: "This genus, whose characters appear to be sufficiently distinct, will include, besides the following new species, several hitherto referred to *Elaeocarpus*, viz. *E. Monocera* Cavanilles, the separation of which has already been suggested, and of which the specific name may be appropriately adopted for the genus, . . ." It is therefore obvious that *Elaeocarpus* § *Monocera* is typified by *E. monocera* Cav., regardless of the breadth of interpretation applied to the concept by Jack, Bentham & Hooker, Masters, or any subsequent students.

Elaeocarpus monocera Cav. (Ic. 6: 1. t. 501. 1801) is a well-known Philippine species, of which ample herbarium material is available (see Merr. Enum. Philip. Fl. Pl. 3: 18. 1923). Its essential characters are as follows: leaves large, aggregated at the ends of thick branchlets; flowers large (sepals to 13 mm. long; petals to 16 mm. long), arranged in comparatively short few-flowered racemes arising from branchlets below leaves; petals copiously and irregularly laciniate, sericeous without, glabrous within; disk annular, 5-lobed, hispid; stamens numerous, with conspicuously awned anthers; ovary elongate-ovoid, densely sericeous, 2-locular, the locules usually 6-ovulate (rarely 4- or 5-ovulate), the style slender; fruit large (up to 7 × 5 cm.), ellipsoid, somewhat flattened, with fibrous mesocarp and very thick bony endocarp, which is slightly rugulose but

without conspicuous processes, the locule apparently single at maturity, with one large flattened seed.

The concept thus typified by *E. monocera* in my opinion definitely includes the Papuanian § *Papuanthus* Schlechter, originally based on eight species, among which a type species was not designated. This oversight is not important, as the original eight species obviously form a coherent section. The only important characters which might be used to separate § *Papuanthus* from § *Monocera* (restricting the latter, for the purpose of clarification, solely to *E. monocera*) are: flowers usually larger, ovules 10–12 per ovary-locule rather than 6 (or 4 or 5), and fruits (in the few species for which they are known) tomentellous or pulverulent. As to the number of ovules, this is known to vary in other coherent groups (e. g. § *Coilopetalum*) between 6 and 12, and therefore great weight cannot be attached to it in the present case. The pubescence of the fruits in § *Papuanthus* does not seem very significant—at least not as significant as other fruit characters such as the large size, the somewhat flattened shape (especially obvious as regards the endocarp and seed), the fibrous mesocarp, and the fairly smooth endocarp without notable processes. These fruit characters are emphasized by Schlechter as distinguishing characters for § *Papuanthus*.

In view of the facts brought out above, I herewith propose to reduce § *Papuanthus* to § *Monocera*, delimiting the latter much more strictly than is currently done. Its geographic limits probably extend considerably beyond the Philippines and Papuaia, but to what extent cannot yet be said. Since Schlechter's work, three other Papuanian species referable to § *Monocera* have been described: *E. comatus* White & Francis, *E. boridensis* Knuth, and *E. lamekotensis* Knuth; although I have seen no collections of the last two, their descriptions indicate that they belong in this section. Below I propose two new species of § *Monocera*, which thus now consists of 13 species in Papuaia.

Elaeocarpus (§ *Monocera*) **Schlechterianus** nom. nov.

Elaeocarpus megacarpus Schlechter in Bot. Jahrb. 54: 131. 1916; non Elmer in Leaflet. Philip. Bot. 7: 2627 (as *E. megacarpa*). 1915.

NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, Idenburg River, alt. 1200 m., *Brass & Versteegh* 12538 (tree 27 m. high, frequent in primary forest of a valley; trunk 57 cm. diam.; crown fairly wide-spreading; bark 9 mm. thick, gray, fairly smooth; wood white; flowers white); Bernhard Camp, Idenburg River, alt. 350 m., *Brass & Versteegh* 13592 (tree 28 m. high, occasional in primary rain-forest on slope of a ridge; trunk 43 cm. diam.; crown not wide-spreading; bark 9 mm. thick, gray-brown, fairly smooth; wood rose; sterile).

Elaeocarpus megacarpus Schlechter was based on *Ledermann* 9439, from the Sepik region of Northeastern New Guinea at about 850 m. altitude, and it has also been reported from the Central Division of British New Guinea by Lane-Poole (Rep. For. Res. Papua 111. 1925) and White and Francis (in Proc. Roy. Soc. Queensl. 38: 238. 1927). Although the *Brass* and *Versteegh* specimens are referred here with reasonable confidence, the determination remains questionable because the type lacked sepals and petals and these organs have not yet been described. In characters of

foliage and stamens, *Brass & Versteegh 12538* agrees precisely with the original description; no. 13592 is sterile but has identical foliage.

The sepals of no. 12538 are 22-23 \times 5-6 mm. and densely tomentellous without; the petals are oblong, 23-25 \times about 10 mm., unequally laciniate with about 25 short segments, and very densely golden-sericeous without; the stamens are about 90 in number and agree with those discussed by Schlechter in dimensions, the anthers being sericeous along the dorsal midline; the densely sericeous ovary is 2-locular, each locule being 10-ovulate, and the style is sericeous except at apex and is subequal to the petals.

Elaeocarpus (§ *Monocera*) *leiophyllus* sp. nov.

Arbor ad 21 m. alta, ramis ramulisque validis teretibus cinereis lenticellatis glabris, ramulis apicem versus 6-9 mm. diametro; foliis ad apices ramulorum aggregatis, petiolis validis puberulis glabratisque supra complanatis 1-4 cm. longis, basi et apice incrassatis, laminis coriaceis in sicco fuscis obovato-ellipticis, (10-) 15-20 (-25) cm. longis, (4-) 7-9 cm. latis, basim versus angustatis et basi ipso anguste rotundato-subcordatis, apice obtusis vel inconspicue mucronulato-cuspidatis, margine remote undulato-crenulatis, utrinque glabris vel costa obscure puberulis, costa valida utrinque prominente, nervis lateralibus utrinsecus 9-13 erecto-patentibus anastomosantibus supra subplanis subtus valde elevatis, rete venularum intricato supra immerso subobscurum subtus leviter prominulo; racemis in ligno vetustiore ortis abbreviatis 3-7-floris, pedunculo brevi et rhachi 1.5-4 cm. longis teretibus validis (2-3.5 mm. diametro) pedicellisque dense et arcte brunneo-tomentello-velutinis, bracteis mox caducis, pedicellis validis sub anthesi 12-25 mm. longis; sepalis crasse carnosius oblongo-lanceolatis acutis, 17-21 mm. longis, 4-5 mm. latis, extus et marginibus latis dense velutino-puberulis, intus sparse pilosis glabratisque; petalis submembranaceis saepe leviter concavis et margine basim versus involutis, oblongo-cuneatis, 20-23 mm. longis, 8-11 mm. latis, extus dense aureo-sericeis, intus glabris vel superne obscure sericeis basim versus incrassato-carinatis, apice inconspicue 3-lobatis et in segmenta 25-30 deltoideo-lanceolata 1-3 mm. longa irregulariter fimbriatis; disco annulari circiter 1 mm. alto sericeo-hispido; staminibus circiter 100 pluriseriatis 16-20 mm. longis ubique minute papillosis, filamentis gracilibus teretibus 8-9 mm. longis, antheris arista exclusa 6-9 mm. longis dorso linea mediana sericeis, arista 1.5-2.5 mm. longa; ovario ellipsoideo 2-loculari et stylo copiose sericeis, loculis 10- vel 12-ovulatis, stylo crasso subulato 15-18 mm. longo superne glabro.

NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, alt. 900 m., *Brass & Versteegh 13525* (TYPE), Mar. 30, 1939 (tree 21 m. high, occasional in primary mossy-forest on the slope of a ridge; trunk 39 cm. diam.; crown not wide-spreading; bark 9 mm. thick, black; wood light yellow; flowers light yellow).

Elaeocarpus leiophyllus appears most closely related to *E. Schlechterianus* A. C. Sm. (*E. megacarpus* Schlechter, non Elmer), at least as that species is interpreted above. Like the new species, *E. Schlechterianus*, as I understand it, is characterized by its essentially glabrous petioles, large flowers, and densely sericeous petals. *Elaeocarpus leiophyllus* differs from this in its shorter petioles, narrower leaf-blades with the veinlet-reticulation immersed and obscure above rather than obviously prominulous, more compact inflorescences, smaller flowers in all parts, and more deeply laciniate petals.

The new species differs from *E. Nouhuysii* Koorders (to which it may be keyed in Schlechter's treatment) in obvious foliage characters and in its sericeous rather than essentially glabrous petals.

Elaeocarpus (§ *Monocera*) *Nouhuysii* Koorders in Nova Guin. Bot. 8: 173. 1909; Schlechter in Bot. Jahrb. 54: 131. 1916.

BRITISH NEW GUINEA: Western Division, Palmer River, 2 miles below junction with Black River, alt. 100 m., *Brass* 7074 (large canopy tree attaining 30 m. or more in height, common on low ridges near river; trunk spur-buttressed; bark thick, gray, somewhat flaky; leaf-blades glabrous and shining, with undulate margins; flowers greenish white, in numerous lateral racemes below the leaves).

The cited specimen agrees very well with the original description of the type, obtained in southern Netherlands New Guinea near Van Weelskamp in the upper Lorentz River region. Our specimen is also a good match for *Schlechter* 16144 (UC), from the Minjem region of Northeastern New Guinea, cited by Schlechter as representing the species. The *Brass* specimen has occasional leaf-blades up to 25×13 cm., and its rachises are sometimes up to 13 cm. long; in general, however, the dimensions of its leaves and flowers approximate those given by Koorders.

Elaeocarpus (§ *Monocera*) *polyandrus* sp. nov.

Arbor ad 20 m. alta, ramis ramulisque validis fusco-nigrescentibus teretibus glabratis, ramulis annotinis cicatricibus foliorum delapsorum conspicue ornatis, ramulis hornotinis 4–5 mm. diametro cano-puberulis; foliis subaggregatis, petiolis subteretibus striatis mox glabratis (4–) 6–9 cm. longis, 2–3 mm. diametro, basi et apice incrassatis, laminis papyraceis in sicco fusco-olivaceis utrinque glabris late ovatis, (8–) 15–23 cm. longis, (5–) 10–15 cm. latis, basi rotundatis, apice ut videtur obtusis, margine anguste revolutis et remote undulato-crenulatis, costa valida utrinque prominente, nervis lateralibus utrinsecus 8–10 subrectis erecto-patentibus supra leviter subtus valde elevatis, rete venularum intricato utrinque prominulo; racemis in axillis foliorum delapsorum ortis abbreviatis 4–6-floris, pedunculo brevi et rhachi 2.5–4 cm. longis teretibus validis (2 mm. diametro) pedicellisque minute sericeo-puberulis mox glabratis, pedicellis validis sub anthesi 2.5–3.7 cm. longis; sepalis crassissimis alutaceis lanceolatis, 20–22 mm. longis, 3–4.5 mm. latis, peracutis, extus sparse sericeo-puberulis glabratis, intus sericeis carinatis; petalis membranaceis oblongo-ellipticis, 23–26 mm. longis, 7–8 mm. latis, basim versus concavis vel involuto-marginatis, extus sparse sericeis, intus glabris et basim versus incrassatis, apice profunde 3-lobatis, quoque lobo 4–8 mm. longo deltoideo integro et acuto vel in segmenta 2 vel 3 breviter conspicue fimbriato; disco annulari erecto-patente carnosissimo superne hispidulo glabrato 1–1.5 mm. alto 10-crenulato; staminibus numerosissimis (circiter 150) pluriseriatis gracilibus 17–20 mm. longis, filamentis teretibus hispido-sericeis 7–9 mm. longis, antheris ubique minute papillois aristis exclusis 7–8 mm. longis, dorso linea mediana sparse sericeis, biaristatis, aristis circiter 2 mm. (interiore) et 3 mm. (exteriore) longis erectis; ovario ellipsoideo 2-loculari arcte sericeo, pariete crassissimo, loculis 12-ovulatis, stylo crasso subulato 17–19 mm. longo inferne sericeo-puberulo superne glabro.

SOLOMON ISLANDS: Bougainville: Kugumaru, Buin, alt. 150 m., *Kajewski* 1866 (TYPE), June 28, 1930 (tree up to 20 m. high, common in rain-forest; petals

yellowish green, tipped with pink; native name: *tu-ah-lu*; timber said by natives to be very durable).

Elaeocarpus polyandrus is very well characterized by its long glabrous petioles, broadly ovate leaf-blades, very thick sepals, few-lobed petals, biaristate anthers, and thick-walled ovary. In foliage the new species suggests *E. lamekotensis* Knuth, of New Ireland, but that species has comparatively short and slender pedicels, much smaller flowers, and more copiously fimbriate petals.

Elaeocarpus (§ *Monocera*) *comatus* White & Francis ex Lane-Poole, Rep. For. Res. Papua 111. 1925, in Proc. Roy. Soc. Queensl. 38: 238. f. 6. 1927.

BRITISH NEW GUINEA: Northern Division, Kumusi River, *Lane-Poole 185* (TYPE COLL.).

This well-marked species of § *Monocera*, referred by its authors to the relationship of *E. amplifolius* Schlechter, is apparently closer to *E. finisterrae* Schlechter, from which it differs in its longer petioles and much smaller flowers.

9. § COILOPETALUM

Elaeocarpus § *Coilopetalum* Schlechter in Bot. Jahrb. 54: 134. 1916.

§ *Coilopetalum* was founded by Schlechter with 13 species, among which no type species was designated. From Schlechter's discussion it appears that he was uncertain of the place of his last four species in this section. Furthermore, he states (l. c.) that "Die typischen, d. h. die dickblättrigen, langstieligen Arten bilden stets grosse Bäume, . . .," indicating that the nucleus of the section, in his concept, was composed of his species numbered 40-42. Of these, *E. clethroides* Schlechter is the only species illustrated, and therefore I believe that it may be designated as the lectotype of § *Coilopetalum*.

It should be pointed out that *E. fuscus* Schlechter and to a certain extent *E. pachyanthus* Schlechter and *E. mallotoides* Schlechter (ex char., none of these three species being available to me) are unusual in the tomentum of their lower leaf-surfaces and inflorescences; in this they strongly suggest a group of five species (*E. trichophyllus* A. C. Sm. and its allies) referred above to § *Blepharoceras*. The line between these two sections becomes weak at this point and the species are divided rather arbitrarily upon characters of petal-shape, texture, and degree of laciniation.

Other described species belonging to § *Coilopetalum* are *E. floridanus* Hemsl., *E. pseudosepicanus* O. C. Schmidt, *E. confertifolius* Knuth, *E. lingualis* Knuth, *E. fuscoides* Knuth, and probably *E. novo-mecklenburgensis* Knuth; some of these are discussed below. To this section I herewith add nine new species, making a total of 28 Papuan species now known in § *Coilopetalum*. The section doubtless extends beyond Papuasias, but I cannot indicate its geographic limits at present.

The more important diagnostic characters of § *Coilopetalum* are as follows: habit usually glabrous or subglabrous, the leaves sometimes hirsute beneath and in a few species closely tomentellous; inflorescences usually associated with leaves or slightly below them; flowers comparatively small

(sepals and petals usually less than 8 mm. long, rarely up to 12 mm. long); petals about the size of the sepals and often somewhat similar in texture, usually narrowed distally and subentire or obscurely toothed (in a few species broadened at apex and distinctly fimbriate), densely sericeous without and often within, often with a conspicuous swollen carina within; stamens comparatively small, variable in number, awned or not; ovary 2- or 3-locular, pubescent (apparently glabrous only in *E. habbemensis*, an aberrant species described below), each locule 6–12-ovulate; fruits comparatively small, the pericarp rarely exceeding 3 mm. in thickness, with thin epicarp, sparse mesocarp, and hard verrucose or rugulose endocarp, the locule solitary and at length apparently 1-seeded.

Elaeocarpus (§ *Coilopetalum*) **sepikanus** Schlechter in Bot. Jahrb. 54: 135. 1916.

NETHERLANDS NEW GUINEA: Bernhard Camp, Idenburg River, alt. 120 m., *Brass & Versteegh 13549* (tree 22 m. high, rare in primary rain-forest on slopes of a ridge; trunk 43 cm. diam.; crown not wide-spreading; bark 10 mm. thick, brown; wood red-brown; flowers dark yellow).

The cited specimen agrees excellently with the original description, based on several Ledermann collections from the Sepik region of Northeastern New Guinea at low elevations, differing only in its slightly longer pedicels and fewer stamens (about 35 rather than about 50). The species has also been reported from the Northern Division of British New Guinea by Lane-Poole and White and Francis, but I believe that the specimen cited by them represents a new species, described below as *E. elatus*.

Elaeocarpus (§ *Coilopetalum*) **fluviatilis** sp. nov.

Arbor ad 25 m. alta inflorescentiis exceptis glabra, ramulis crassis apicem versus 5–6 mm. diametro et dense foliatis; petiolis rectis 3–4.5 cm. longis supra complanatis; laminis papyraceis vel chartaceis siccitate olivaceis ellipticis, 9–15.5 cm. longis, 4–6 cm. latis, basi anguste rotundatis vel late obtusis, apice in acuminem 1–2 cm. longum obtusum abrupte angustatis, margine dentibus circiter 2 per centimetrum conspicue crenatis, costa et nervis secundariis utrinsecus 5–7 adscendentibus supra paullo elevatis subtus prominentibus, rete venularum intricato utrinque prominulo; racemis axillaribus subrectis 5–10 cm. longis plerumque 15–20-floris, pedunculo 1.5–3 cm. longo et rhachi angulatis robustis pedicellisque dense et breviter argenteo-sericeis, pedicellis gracilibus sub anthesi 5–7 mm. longis, alabastris ovoideis circiter 5 mm. longis cuspidatis angulatis; sepalis 5 papyraceis vel subcarnosis ovato-ellipticis, 6–7 mm. longis, circiter 3 mm. latis, breviter acuminatis, extus puberulis, intus glabris; petalis 5 papyraceis ovato-ellipticis circiter 5×2.5 mm., apice acutis et integris, utrinque dense aureo-sericeis, pilis intus retrorsis, carina inconspicua; disco inconspicuo 10-lobato, lobis circiter 0.2 mm. altis superne hirtellis; staminibus 65–70 pluriseriatis 3–4 mm. longis, filamentis 0.4–1.2 mm. longis sericeo-hispidis, antheris dorso sericeis arista 0.5–0.8 mm. longa excepta circiter 2 mm. longis; ovario ovoideo 2-loculari dense sericeo, loculis 12-ovulatis, stylo subulato glabro circiter 2 mm. longo.

BRITISH NEW GUINEA: Central Division, Kubuna, alt. 100 m., *Brass 5569* (A, TYPE, NY), Nov. 25, 1933 (tree 20–25 m. high, common in riverine rain-forests; trunk raised above ground on an irregular mass of prop-roots about 1 m. high).

From the closely related *E. sepikanus* Schlechter, *E. fluviatilis* differs in its more distinctly toothed leaf-margins, more copiously flowered racemes, and more numerous and shorter stamens with longer awns.

Elaeocarpus (§ *Coilopetalum*) *confertifolius* Knuth in Rep. Sp. Nov. 48: 74. 1940.

BRITISH NEW GUINEA: Central Division, Koitaki, alt. about 450 m., Carr 12697 (NY).

Elaeocarpus confertifolius is based on Carr 12067, a flowering specimen not available to me, also from Koitaki. No. 12697 agrees precisely with the original description except for its slightly smaller leaf-blades. The fruits are ellipsoid, about 10×7 mm. at apparent maturity, rugulose when dried, with a pericarp about 2 mm. thick, a verrucose endocarp, and a single one-seeded locule. The habit and fruit of no. 12697 are obviously of § *Coilopetalum*, and the original description of the flower also implies this section; the species appears to be of the general relationship of *E. clethroides* Schlechter.

Elaeocarpus (§ *Coilopetalum*) *idenburgensis* sp. nov.

Arbor ad 16 m. alta inflorescentiis exceptis glabra, ramulis subteretibus superne 3–5 mm. diametro brunneis copiose lenticellatis; foliis apicem ramulorum versus confertis, petiolis gracilibus 3–5 cm. longis leviter canaliculatis, laminis chartaceis in sicco fusco-viridibus ellipticis, 8–13 cm. longis, 4–6 cm. latis, basi anguste rotundatis vel obtusis, apice in acuminem ad 1 cm. longum obtusum cuspidatis, margine dentibus 2 vel 3 per centimetrum inconspicue serrulato-crenulatis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 5–7 adscendentibus supra prominulis subtus elevatis et in axillis saepe domatiiferis, rete venularum copiosis utrinque prominulo; racemis axillaribus 3–8 cm. longis 8–15-floris, pedunculo brevi et rhachi angulatis pedicellisque pallide puberulis demum glabratis, pedicellis gracilibus curvatis sub anthesi 6–7 mm. longis, alabastris ovoideis 4–5 mm. longis cuspidatis leviter angulatis; sepalis 5 papyraceis crasso-marginatis ovato-oblongis, circiter 6 mm. longis et 2 mm. latis, apice breviter acuminatis, extus breviter sericeis, intus glabris carinatis, petalis 5 carina intus incrassata excepta submembranaceis, oblongis, 5.5–6 mm. longis, circiter 2 mm. latis, apice truncato irregulariter et minute 3–5-denticulatis, margine involutis, utrinque dense sericeis (pilis margine et intus carina retrorsis); disco 10-lobato, lobis deltoideo-oblongis 0.2–0.3 mm. altis et latis superne hispidulis; staminibus 36–39, 2 3-seriatis, 3–3.5 mm. longis, filamentis sericeis 0.7–1.3 mm. longis, antheris oblongis circiter 2 mm. longis minute hispidulo-papillois apice obscure mucronulatis; ovario ovoideo 2-loculari dense sericeo, loculis 12-ovulatis, stylo subulato glabro circiter 2.5 mm. longo.

NETHERLANDS NEW GUINEA: 4 km. southwest of Bernhard Camp, Idenburg River, alt. 850 m., Brass 13458 (TYPE), Mar. 1939 (subsidiary tree 16 m. high, in rain-forest of the ridges; trunk 20 cm. diam.; flowers numerous, pale yellow, sweet-scented).

Elaeocarpus idenburgensis is a species of the general relationship of *E. clethroides* Schlechter, from which it differs in its shorter-petiolate and smaller leaf-blades with crenulate margins, its shorter racemes, its slightly larger and 5- rather than 4-merous flowers, and its fewer stamens and more numerous ovules. *Elaeocarpus flavescens* Schlechter, another related

species, differs from *E. idenburgensis* in its short-petiolate obovate subentire leaf-blades, obtuse flower-buds, smaller flowers, and fewer stamens.

Elaeocarpus (§ *Coilopetalum*) *brevirostris* sp. nov.

Arbor inflorescentiis exceptis ubique glabra, ramulis teretibus apicem versus 5–6 mm. diametro cicatricibus foliorum delapsorum conspicue ornatis; foliis apicem ramulorum versus confertis, petiolis gracilibus (ad 1 mm. diametro) 3–4 cm. longis supra paullo complanatis, laminis chartaceis vel papyraceis in sicco viridibus oblongo- vel obovato-ellipticis, 10–12 cm. longis, 4–5.3 cm. latis, basi anguste rotundatis, apice obtusis vel obtuse cuspidatis, margine obscure undulato-crenulatis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 5–7 adscendentibus supra prominulis subtus valde elevatis in axillis saepe domatiiferis, rete venularum intricato utrinque prominulo; racemis apicem ramulorum versus confertis saepe in axillis foliorum delapsorum ortis ut videtur 10–20-floris, pedunculo brevi et rhachi leviter angulata (3–) 6–8 cm. longis gracilibus pedicellisque arcte sericeis, pedicellis sub anthesi 5–8 mm. longis saepe curvatis, alabastris ovoideis 5 mm. longis peracute cuspidatis; sepalis papyraceis ovato-lanceolatis, 6–6.5 mm. longis, 2–2.3 mm. latis, cuspidatis, extus pallide breviter sericeis, intus glabris carinatis; petalis subcarnosis et intus bulboso-incrassato-carinatis, in sicco roseo-purpureis, oblongo-ellipticis, 5.5–6 mm. longis, 2–2.5 mm. latis, margine valde involutis, apice in segmenta 4–6 ad 0.5 mm. longa obscure fimbriatis, utrinque dense aureo-sericeis (pilis intus et margine retrorsis); disco inconspicuo dense hispidulo; staminibus 50–60 pluri-seriatis 3–4 mm. longis, filamentis 1.5–2 mm. longis dense sericeo-hispidulis, antheris obscure papillois arista rigida 0.3–0.5 mm. longa inclusa 1.5–2 mm. longis; ovario ellipsoideo 2-loculari et styli basi pallide sericeis, loculis 10-ovulatis, stylo crasso 2.5–3 mm. longo superne glabro.

NORTHEASTERN NEW GUINEA: Morobe District, Sattelberg, alt. 900 m., *Clemens* 2270 (TYPE), Apr. 9, 1936.

Elaeocarpus brevirostris is closely related to *E. sarcanthus* Schlechter, which, according to the description, has coriaceous and slightly smaller leaf-blades, shorter petioles and pedicels, and obtusish sepals which are densely puberulent within. The new species also bears a close superficial similarity to *Clemens* 195, from the Morobe District, which Knuth has cited as representing his *E. novo-mecklenburgensis*. From this specimen and the description of *E. novo-mecklenburgensis*, the new species differs in its longer and more slender petioles, shorter racemes, sericeous rachis, pedicels, and sepals, ovoid flower-bud, densely sericeous petals, aristate anthers, and sericeous ovary. The fact that the petals of *E. novo-mecklenburgensis* are described as “. . . extus basin versus sparsim pilosa, ceterum glabra . . .” does not suggest § *Coilopetalum*, but in other respects the species appears to belong here, especially if *Clemens* 195 has been correctly referred to it.

Elaeocarpus (§ *Coilopetalum*) *elatus* sp. nov.

Elaeocarpus sepikanus sensu Lane-Poole, Rep. For. Res. Papua 111. 1925; White & Francis in Proc. Roy. Soc. Queensl. 38: 239. 1927; non Schlechter.

Arbor grandis inflorescentiis exceptis glabra, ramulis subfuscis superne 3–5 mm. diametro; petiolis ad 1.5 mm. diametro 4–6 cm. longis leviter canaliculatis; laminis papyraceis in sicco fusco-viridibus oblongo-ellipticis,

10–14.5 cm. longis, 5.5–8 cm. latis, basi rotundatis vel late obtusis, apice in acuminem ad 1 cm. longum obtusum abrupte angustatis, margine evidenter crenulato-undulatis, costa supra valde elevata subtus prominente, nervis lateralibus utrinsecus 7–9 arcuato-patentibus supra prominulis subtus conspicue elevatis in axillis plerumque domatiiferis, rete venularum copioso utrinque valde prominulo; racemis axillaribus brevipedunculatis ad 11 cm. longis (vel ultra?) ut videtur 15–20-floris, rhachi crassa (2–3 mm. diametro) pedicellisque pallide farinoso-puberulis, pedicellis sub anthesi 7–9 mm. longis, alabastris ovoideis obtusis; sepalis crasso-carnosis oblongo-lanceolatis, circiter 7 mm. longis, 2.5–3 mm. latis, subacutis, extus et margine incrassato arcte puberulis, intus glabris et valde carinatis; petalis carina incrassato-carnosa intus excepta papyraceis oblongo-ellipticis, circiter 7 mm. longis, 2–3 mm. latis, margine saepe involutis, apice in dentes circiter 0.5 mm. longos acutos inconspicue lobatis, utrinque dense sericeis (pilis intus retrorsis); disco 10-lobato, lobis carnosus patulis deltoideo-oblongis circiter 0.6 mm. longis sparse hispidulis; staminibus circiter 80 pluriseriatis 4.5–5 mm. longis, filamentis circiter 1.5 mm. longis subteretibus glabris, antheris minute papillosis arista erecta 0.5–0.7 mm. longa excepta 2.5–3 mm. longis; ovario ellipsoideo 2-loculari et styli basi breviter sericeis, loculis 10-ovulatis, stylo crasso circiter 2.5 mm. longo superne glabro.

BRITISH NEW GUINEA: Northern Division, Buna District, in forests near village of Wasida and along main path to Wire Rope, alt. up to 450 m., *Lane-Poole 178* (TYPE), July 1922 (large tree, with 60-ft. bole and 8-ft. girth; bark about 6 mm. thick, gray mottled with brown; wood white to cream-colored; flowers cream-colored; native name: *tangere* [notes from Lane-Poole, l.c.]).

Elaeocarpus elatus clearly differs from *E. sepikanus* in its toothed petals, among other characters, and is more closely allied to *E. sarcanthus* Schlechter and *E. brevirostris* (described above). From both of these, the new species differs in its larger leaves and flowers, longer leaf-apices, more numerous stamens, and in other details of foliage and inflorescence. Although White and Francis (l. c.) state that the ovary of *Lane-Poole 178* is 3-celled, it appears to be 2-celled in the flowers dissected by me, but this character may not be stable.

Elaeocarpus (§ *Coilopetalum*) *lingualis* Knuth in Rep. Sp. Nov. 48: 76. 1940.

NORTHEASTERN NEW GUINEA: Morobe District: Yoangen, alt. about 1250 m., *Clemens 6597* (COTYPE COLL.); Ogeramnang, alt. about 1750 m., *Clemens 4833* (COTYPE COLL.) (large tree, on forested hill; fruit slate-blue), *5463* (COTYPE COLL.); Matap, alt. 1500–1800 m., *Clemens 11103* (tree, the trunk 15–25 cm. diam.; fruit lead-blue), *11220* (tree, the trunk 30 cm. diam.; fruit slate-blue); Wantoat, *Clemens 41193* (tree, the trunk 25 cm. diam.; fruit lead-blue). NETHERLANDS NEW GUINEA: 18 km. southwest of Bernhard Camp, Idenburg River, alt. 1800 m., *Brass & Versteegh 12510* (rare tree 34 m. high; trunk 42 cm. diam.; crown not wide-spreading; bark 12 mm. thick, gray; sap-wood white; heart-wood brown-yellow; flowers orange-brown); Bele River, 18 km. northeast of Lake Habbema, alt. about 2300 m., *Brass & Versteegh 11125* (tree 15 m. high, common in old secondary forest; trunk 29 cm. diam.; crown not wide-spreading; bark 4 mm. thick, fairly smooth, gray-brown; wood white; fruits blue); Balim River, alt. 2050 m., *Brass & Versteegh 11186* (tree 9 m. high, in low open forest on a sandy slope; trunk 34 cm. diam.; crown fairly wide-spreading; bark 6 mm. thick, gray, smooth; wood white; fruits dark green).

The first three collections cited above were listed by Knuth without designation of the type; *Clemens 6579* and *Brass & Versteegh 12510* bear

flowers and the remaining specimens fruits. Clearly a member of § *Coilopetalum*, this well-marked species is probably most closely allied to *E. sarcanthus* Schlechter, differing in its longer petioles, larger leaf-blades, anthers which are minutely apiculate at apex but scarcely “. . . in setam brevem subulatam exeunte . . .,” and more numerous ovules. The sepals and petals are up to 8 mm. long, the latter being obscurely denticulate at apex; the stamens are about 50, and the ovary is 2-locular, each locule having 12 ovules. Although the specimens from Netherlands New Guinea have the leaves averaging smaller than those from the Morobe District, the differences among the cited specimens appear no more than individual. The fruiting inflorescences of *Brass & Versteegh 11186* are up to 18 cm. long, while the remaining specimens, both flowering and fruiting, have the inflorescences only 3–11 cm. long.

Elaeocarpus (§ *Coilopetalum*) *floridanus* Hemsl. in Kew Bull. 1896: 158. 1896; Schlechter in Bot. Jahrb. 54: 143. 1916.

SOLOMON ISLANDS: Bougainville: Kugumaru, Buin, alt. 150 m., *Kajewski 1896* (tree up to 20 m. high, common in rain-forest; fruit black when ripe, about 12×7 mm.; native name: *nor-kiri-tor*); Koniguru, Buin, alt. 950 m., *Kajewski 2085* (tree up to 20 m. high, common in rain-forest; fruit black when ripe, up to 11×8 mm.; native name: *gucana*); Marmaromino, alt. 50 m., *Kajewski 2201* (tree up to 15 m. high, common in rain-forest; flowers fragrant, cream-colored; fruit shiny, dark green or bluish, up to 13×9 mm.; native name: *bi-ri-gimor*); Olevunga, N'Gela (Florida Islands): *Brass 3490* (pale-barked small tree, in coastal rain-forest; leaf-blades with pale costa and nerves; fruit immature); Guadalcanal: Quoi-mon-apu, alt. sea-level, *Kajewski 2349* (tree up to 30 m. high, common in rain-forest; flower-buds green; native name: *isikor*).

Elaeocarpus floridanus, based on *Guppy 231* from Florida Island, was not placed by Schlechter, but the above-cited specimens agree excellently with the original description, and the place of the species in § *Coilopetalum* is certain. The ovary is 3-locular and each locule is 6-ovulate (in *Kajewski 2201*, which has mature flowers). The relationship of Hemsley's species is probably with *E. sarcanthus* Schlechter, which has on the average shorter petioles and smaller leaf-blades, much shorter racemes and pedicels, and fewer flowers.

Elaeocarpus (§ *Coilopetalum*) *microdontus* Schlechter in Bot. Jahrb. 54: 140. 1916.

NETHERLANDS NEW GUINEA: Behind Hollandia, alt. 300 m., *Gjellerup 678* (TYPE COLL.), Sept. 1911.

As this species was only very briefly discussed by Schlechter, I offer a more complete description below. As indicated in the original publication, the species is close only to *E. subinteger* Schlechter, differing in its shorter petioles and racemes, slightly smaller flowers, truncate and obscurely toothed rather than subentire and obtusish petals, and fewer stamens. It should be noted that the characters of “. . . Stamina ca. 15, ca. 3 mm. long . . .,” mentioned in Schlechter's key, are not entirely accurate.

Arbor gracilis (?), ramis ramulisque gracilibus nigrescentibus subteretibus, juventute sericeis et cicatricibus confertis foliorum delapsorum ornatis, squamulis coriaceis 2–3 mm. longis plus minusve persistentibus; foliis apicem ramulorum versus aggregatis, petiolis gracilibus 5–7 mm. longis supra complanatis sericeis mox glabris, laminis subcoriaceis glabris obo-

vatis, 5–7 cm. longis, 2.5–3.5 cm. latis, basim versus gradatim angustatis, apice rotundatis vel breviter et obtuse cuspidatis, margine integris vel obscure undulatis, costa utrinque valde elevata, nervis lateralibus utrinsecus 4 vel 5 arcuatis supra subplanis subtus elevatis, rete venularum laxo supra leviter subtus valde prominulo; racemis axillaribus patentibus gracilibus 6–8-floris, pedunculo brevi et rhachi 2.5–3.5 cm. longis pedicellisque breviter argenteo-sericeis, pedicellis sub anthesi circiter 5 mm. longis; sepalis tenuiter carnosus deltoideo-lanceolatis, 5–6 mm. longis, 1.3–1.7 mm. latis, acutis, utrinque breviter sericeis, intus glabratis carinatis; petalis carina intus bulboso-carnosa excepta membranaceis, ovato-oblongis, 4.5–5 mm. longis, circiter 1.5 mm. latis, utrinque breviter sericeis, carina intus copiose longe sericeis, margine valde involutis et hispidulis, apice angustato subtruncatis, dentibus 3 vel 4 obtusis inconspicuis; disco pulvinato carnoso circiter 0.4 mm. alto conspicue 10-lobato minute hispidulo; staminibus circiter 20 uniseriatis 3.5–4.5 mm. longis ubique minute hispidulis, filamentis gracilibus teretibus 1.5–2.5 mm. longis, antheris (arista 0.4–0.7 mm. longa excepta) 1.3–1.5 mm. longis; ovario 2-loculari copiose hispido-sericeo, loculis 8-ovulatis, stylo subulato circiter 3 mm. longo glabro.

Elaeocarpus (§ *Coilopetalum*) **fuscoides** Knuth in Rep. Sp. Nov. 48: 75. 1940.

NORTHEASTERN NEW GUINEA: Morobe District, Ogeramngang, alt. about 1800 m., *Clemens 4599, 4681A* (TYPE COLL.).

This very well marked species, as indicated by Knuth's choice of a specific epithet, suggests *E. fuscus* Schlechter in its indument; the differences between the two species, both foliar and floral, are conspicuous. The petals of *E. fuscoides* are conspicuously carinate within and sericeous on both surfaces, divided into three main lobes and quite obviously fimbriate; the sericeous ovary is 2-locular, each locule being 12-ovulate.

Elaeocarpus (§ *Coilopetalum*) **pyncanthus** sp. nov.

Arbor ad 26 m. alta, ramulis teretibus apicem versus 3–4 mm. diametro primo puberulis mox glabratis, squamulis subpersistentibus lanceolatis 3–4 mm. longis squarrosis, cicatricibus foliorum delapsorum ornatis; foliis apicem ramulorum versus confertis, petiolis gracilibus inconspicue canaliculatis (1.5–) 2–3 cm. longis glabris vel cito glabratis, laminis subcoriaceis in sicco fuscescentibus anguste oblongis, 7–12 cm. longis, (1.5–) 2–3.3 cm. latis, basi late obtusis vel anguste rotundatis, apice in acuminem obtusum 5–10 mm. longum gradatim angustatis, margine leviter recurvatis et inconspicue undulato-crenulatis, utrinque glabris vel costa et interdum lamina disperse sericeo-puberulis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 7–9 brevibus erecto-patentibus supra subplanis subtus valde elevatis et in axillis saepe conspicue domatiiferis, rete venularum intricato utrinque leviter prominulo; racemis axillaribus 7–12-floris, pedunculo conspicuo ad 2.5 cm. longo et rhachi 3–5 cm. longis pedicellisque dense breviter sericeis, pedunculo demum glabrato, bracteis subcoriaceis tripartitis, dentibus lateralibus subpersistentibus subulatis circiter 2 mm. longis, pedicellis 6–8 mm. longis; sepalis tenuiter carnosus acutis oblongo-lanceolatis, 6–7 mm. longis, 2–2.5 mm. latis, extus breviter pallido-sericeis, intus margine incrassato copiose puberulo excepto glabris carinatis; petalis subcarnosis et intus bulboso-incrassato-carinatis, oblongis, 7–8 mm. longis, 2.5–3.5 mm. latis, margine basim versus involutis, apice in segmenta 9–11 lanceolata

acuta 1–1.5 mm. longa subaequalia laciniatis, extus copiose pallido-sericeis, margine retrorse sericeis, intus basim versus praecipue carina antrorse sericeis superne glabris, disci lobis 10 patulis deltoideis circiter 0.7 mm. longis superne hispidulis; staminibus 35–40 ubique minute sericeo-hispidulis 4–4.5 mm. longis, filamentis teretibus 1.5–2 mm. longis, antheris arista 0.2–0.5 mm. longa saepe recurva inclusa 2.5–2.8 mm. longis; ovario ellipsoideo 3-loculari et styli basi dense sericeis, ovarii pariete crasso, loculis 8-ovulatis, stylo crasso 3–3.5 mm. longo superne glabro; fructibus ellipsoideis submaturis ad 11×7 mm., apice obtusis, pericarpio in sicco circiter 2 mm. crasso, epicarpio tenui ruguloso, mesocarpio fibroso, endocarpio verrucoso, loculo et semine solitariis.

NETHERLANDS NEW GUINEA: 15 km. southwest of Bernhard Camp, Idenburg River, alt. 1780–1800 m., *Brass & Versteegh 11903* (tree 26 m. high, rare in primary forest on slope of a ridge; trunk 51 cm. diam.; crown fairly wide-spreading; bark 10 mm. thick, fairly rough; sap-wood yellow-brown; heart-wood dark brown; fruits green), *Brass 12146, 12148* (common subsidiary trees in mossy-forest of upper slopes, up to 20 m. high; trunk 20 cm. diam.; tips of branchlets exuding a gray resin; leaves concave; fruits immature), *Brass 12292* (TYPE), Jan. 1939 (common subsidiary tree in lower edges of mossy-forest; tips of branches resinous; flowers cream-colored).

The petals of *E. pycnanthus* at anthesis are oblong and clearly lacinate, but the place of the species in § *Coilopetalum* is indicated by the densely sericeous character of the petals and their swollen carina. The closest relative of the new species appears to be *E. Ledermannii* Schlechter, from which it differs in its proportionately much narrower leaf-blades which are subglabrate beneath, longer pedicels, oblong rather than ovate petals, and 3- rather than 2-locular ovary.

Elaeocarpus (§ *Coilopetalum*) *poculiferus* sp. nov.

Arbor ad 29 m. alta partibus juvenilibus puberulis inflorescentiisque exceptis glabra, ramulis apicem versus 3–5 mm. diametro, squamulis parvis interdum squarrosis; foliis apicem ramulorum versus confertis, petiolis gracilibus canaliculatis 7–15 mm. longis, laminis coriaceis in sicco fuscescentibus anguste elliptico-oblongis, 4–9 cm. longis, 1.2–2.5 cm. latis, basi acutis vel obtusis et in petiolum decurrentibus, apice obtusis, margine saepe valde recurvatis et dentibus 3–5 per centimetrum crenulatis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 5–8 brevibus arcuatis supra subprominulis subtus acute elevatis et in axillis plerumque conspicue domatiiferis, rete venularum intricato utrinque prominulo; racemis axillaribus erectis 5–10 cm. longis 4–8-floris, pedunculo conspicue elongato ad 7 cm. longo subtereti mox glabrato, rhachi brevi pedicellisque breviter sericeo-puberulis, bractearum dentibus lateralibus coriaceis subsistentibus subulatis circiter 2 mm. longis, pedicellis 7–16 mm. longis, alabastris elongato-conoideis acutis; sepalis subcarnosis lanceolatis, 10–11 mm. longis, basim versus 2–3 mm. latis, deinde ad apicem acuminatum gradatim angustatis, extus breviter sericeis, margine puberulis, intus glabris carinatis; petalis submembranaceis vel tenuiter carnis et intus bulboso-incrassato-carinatis, oblongo-cuneatis, 9–12 mm. longis, 3–5 mm. latis, saepe concavis, extus copiose pallido-sericeis, intus carina basim versus sericeo-tomentella excepta glabris, apice in segmenta 9–15 lanceolata acuta 2–4 mm. longa conspicue patenti-fimbriatis; disci lobis 10 carnis deltoideo-oblongis patentibus circiter 0.5 mm. diametro sparse hispidulis; staminibus 30–40

erectis 6–7 mm. longis, filamentis teretibus glabris gracilibus 1.5–2 mm. longis, antheris minute papillosis dorso sparse sericeis arista rigida interdum reflexa 1.5–2 mm. longa excepta 2–3 mm. longis; ovario ovoideo-subgloboso 3-loculari et styli basi sericeis, ovarii pariete crasso, loculis 8-ovulatis, stylo subulato 4.5–5 mm. longo superne glabro; fructibus ellipsoideis ad 12×8 mm., apice subacutis, pericarpio in sicco 2–3 mm. crasso, epicarpio tenui ruguloso, mesocarpio inconspicue fibroso, endocarpio verrucoso, loculo et semine solitariis.

NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. 2700–2820 m., *Brass & Versteegh 10451, 10451A* (trees up to 21 m. high, frequent in forest of valleys; trunk about 29 cm. diam.; crown not wide-spreading; bark 6 mm. thick, brown, shallowly fissured; wood white; flowers yellowish green; young fruits green), *Brass 10767* (TYPE), Oct. 1938 (profusely flowering tree up to 25 m. high, common in forest of lower slopes and valley bottoms; flowers greenish yellow); 18 km. southwest of Bernhard Camp, Idenburg River, alt. 2200 m., *Brass & Versteegh 11991* (tree 29 m. high, frequent in primary forest on slope of a ridge; trunk 53 cm. diam.; crown not wide-spreading; bark 12 mm. thick, black; sap-wood white; heart-wood red-brown; fruits blue-green).

Although obviously related to the preceding new species (*E. pycnanthus*), *E. poculiferus* differs from it in its shorter petioles, smaller leaf-blades with obtuse rather than acuminate apices, longer-pedunculate and fewer-flowered inflorescences, substantially larger flowers, more deeply fimbriate petals, and stamens with more elongate awns. Although the petals of *E. poculiferus* are not of the type commonly occurring in § *Coilopetalum*, its relationships are definitely with this section.

Elaeocarpus (§ *Coilopetalum*) *habbemensis* sp. nov.

Arbor ad 25 m. alta inflorescentiis exceptis ubique glabra, ramulis hornotinis subangulatis flavo-brunneis 2–3 mm. diametro, ramulis annotinis teretibus cinereis verrucoso-lenticellatis; petiolis gracilibus canaliculatis 10–22 mm. longis; laminis subcoriaceis in sicco flavescentibus ellipticis, 5–9 cm. longis, 2.5–4.5 cm. latis, basi late obtusis, apice rotundatis vel late obtusis, margine dentibus 3–5 per centimetrum conspicue crenulato-serratis, costa supra elevata subtus prominente, nervis lateralibus utrinsecus 5–7 erecto-patentibus anastomosantibus supra paullo insculptis subtus elevatis et in axillis saepe conspicue domatiiferis, rete venularum intricato utrinque prominulo; racemis axillaribus suberectis 4–10 cm. longis 6–12-floris, pedunculo 2–4 cm. longo et rhachi gracilibus leviter angulatis pedicellis minute sericeo-puberulis demum subglabratibus, pedicellis gracilibus curvatis 10–16 mm. longis, alabastris anguste ovoideis acutis; sepalis papyraceis acutis oblongo-lanceolatis, 7–8 mm. longis, circiter 2 mm. latis, utrinque breviter sericeis, intus glabratibus, margine incrassato puberulis; petalis submembranaceis, basim versus paullo incrassatis et intus inconspicue carinatis, obovato-cuneatis, 6–8 mm. longis, 2.5–3 mm. latis, in segmenta 10–12 lanceolata 1.5–2 mm. longa irregulariter fimbriatis, extus dense sericeis, intus carina sericeo-hispidula excepta glabratibus; disco annulari-pulvinato crenulato circiter 0.7 mm. alto sparse hispidulo; staminibus 22–27 ubique minute hispidulis 4–4.5 mm. longis, filamentis gracilibus subteretibus 0.7–1.3 mm. longis, antheris apiculo inconspicuo 0.3–0.5 mm. longo incluso 3–3.5 mm. longis; gynaeceo glabro, ovario ellipsoideo 2-loculari, loculis 8–10-ovulatis, stylo subulato circiter 3.5 mm. longo; fructibus ellipsoideis

ad 16×10 mm., apice basi styli apiculatis, pericarpio 1–1.5 mm. crasso, epicarpio et endocarpio extus rugulosus, mesocarpio subnullo, loculo solitario vel dissepimento interdum subpersistente.

NETHERLANDS NEW GUINEA: 9 km. northeast of Lake Habbema, alt. 2700–2840 m., *Brass & Versteegh 10444* (tree 22 m. high, rare in mossy-forest, on a ridge; trunk 37 cm. diam.; crown not wide-spreading; bark 9 mm. thick, smooth, brown; outer wood white; inner wood gray-green; fruits green), *Brass & Versteegh 11101* (TYPE), Oct. 29, 1938 (tree 25 m. high, frequent in mossy-forest; trunk 35 cm. diam.; crown not wide-spreading; bark 6 mm. thick, gray, fairly smooth; outer wood white; inner wood brown; flowers white; young fruits green).

Although the petals of this species are broader and more copiously lacinate than in most species of § *Coilopetalum*, while the glabrous ovary is also aberrant in this section, nevertheless this seems the best place for it. Its relationship is doubtless with *E. Ledermannii* Schlechter and the two new species described above (*E. pycnanthus* and *E. poculiferus*), from all of which its glabrous ovary and its petals, which are subglabrous and obscurely carinate within, readily distinguish it. *Elaeocarpus habbemensis* is further differentiated by its elliptic obtuse leaf-blades, glabrous habit, subentire disk, and many minor characters.

Elaeocarpus (§ *Coilopetalum*) *luteolus* sp. nov.

Arbor ad 15 m. alta copiose ramosa, ramulis hornotinis leviter angulatis 1.5–2 mm. diametro pallide sericeis squamulis minutis saepe squarrosis, ramulis annotinis glabratis teretibus verrucoso-lenticellatis; petiolis gracilibus canaliculatis 4–9 mm. longis mox glabratis; laminis chartaceis vel subcoriaceis in sicco pallide viridibus vel fusciscentibus ellipticis, (2–) 3–7 cm. longis, (1.2–) 1.5–3 cm. latis, basi obtusis vel acutis, apice obtusis vel obtuse breviter cuspidatis, margine recurvatis et dentibus 3–6 per centimetrum spinuloso-serrulatis, supra costa interdum puberula excepta glabris, subtus nervis venulisque sparse sericeo-hispidulis demum glabratis, costa supra acute prominula subtus valde elevata, nervis lateralibus utrinsecus 4 vel 5 adscendentibus supra leviter impressis subtus elevatis, rete venularum intricato utrinque prominulo vel supra subplano; racemis axillaribus 3–6 (–11) cm. longis 6–9 (–15)-floris, pedunculo conspicuo ad 3 (–4) cm. longo glabrato, rhachi gracillima pedicellisque breviter sericeo-puberulis, bracteis oblongis 2–3 mm. longis mox caducis basi dentes 2 laterales subulatos gerentibus, pedicellis gracilibus 5–11 mm. longis, alabastris ovoideis subacutis; sepalis papyraceis acutis oblongo-lanceolatis, 5–6 mm. longis, 1.3–1.8 mm. latis, extus dense sericeis, intus puberulis carinatis; petalis tenuiter carnosissimis obovato-cuneatis, 5–6 mm. longis, 2–2.3 mm. latis, utrinque dense pallido-sericeis, intus planis, apice rotundatis et in segmenta 9–18 lanceolato-linearibus 0.7–1.2 mm. longa fimbriatis; disco annulari crenulato circiter 0.5 mm. alto brunneo-hispidulo; staminibus 15–18 ubique minute sericeo-hispidulis 2.5–3.2 mm. longis, filamentis gracilibus 1–1.5 mm. longis, antheris mucrone obscuro circiter 0.15 mm. longo incluso 1.4–1.7 mm. longis; ovario ellipsoideo 2-loculari et styli basi dense sericeis, loculis 8 (raro 6- vel 7-)-ovulatis, stylo subulato 2.5–3 mm. longo superne glabro; fructibus ellipsoideis submaturis ad 10×7 mm., apice obtusis et stylo subpersistente saepe mucronulatis, pericarpio 1.5–2 mm. crasso, epicarpio tenui ruguloso, mesocarpio fibroso, endocarpio ut videtur sublevi, loculo et semine solitariis.

NETHERLANDS NEW GUINEA: Bele River, 18 km. northeast of Lake Habbema, alt. 2200–2300 m., *Brass* 11073 (TYPE), Nov. 1938 (small bushy tree 3 m. high, on edge of a forest clearing; flowers yellow; fruits immature), *Brass* 11334 (tree 15 m. high, in old secondary forest; trunk 20 cm. diam.; flowers brown; fruits blue-green).

From *E. altigenus* Schlechter, its only close ally, *E. luteolus* differs in its shorter petioles, obtuse or obtusely cuspidate (rather than long-acuminate) leaf-blades, which are thicker in texture and have the veinlet-reticulation less obvious, and mucronulate rather than obviously aristate anthers. Examination of an isotype of *E. altigenus* (*Schlechter* 18793 [UC], from the Bismarck Mts., Northeastern New Guinea) shows that the anthers of that species bear conspicuous awns at least 1 mm. long. These two species form a compact group and, in spite of the plane rather than carinate inner surfaces of their petals, their position in § *Coilopetalum* is unquestionable. Number 11334 has smaller leaves than the type of *E. luteolus*, but in other respects the cited specimens are identical; my description is inclusive.

Elaeocarpus (§ *Coilopetalum*) *fulgens* sp. nov.

Arbor ad 30 m. alta, ramulis apicem versus 2–4 mm. diametro striatis dense brunneo-sericeis, ramulis annotinis subteretibus fusco-cinereis glabrat; petiolis gracilibus supra complanatis 1–2 cm. longis breviter sericeis; laminis chartaceis vel subcoriaceis in sicco supra fusco-viridibus subtus pallidioribus fulgentibusque, oblongo-ellipticis, 4–7 cm. longis, 1.5–3 cm. latis, basi late obtusis, apice in acuminem ad 1 cm. longum saepe mucronulatum angustatis, margine dentibus 5–7 per centimetrum nigro-mucronulatis obscure serrulatis, supra costa interdum puberula excepta glabris, subtus densissime et persistenter argenteo-sericeis, costa supra peracute prominula subtus prominente, nervis lateralibus utrinsecus 5–7 adscendentibus supra subplanis subtus elevatis, rete venularum intricato supra leviter prominulo subtus indumento occulto; racemis axillaribus 5–10-floris, pedunculo brevi et rhachi gracilibus pedicellisque dense et breviter sericeo-hispidulis, pedicellis 3–8 mm. longis; sepalis petalisque non visis; disci lobis 5 carnosis oblongis bilobatis circiter 0.4 mm. altis sparse hispidulis; staminibus sub fructu juvenili saepe persistentibus circiter 2 mm. longis, filamentis gracilibus hispidulis 0.8–1 mm. longis, antheris anguste ellipsoideo-oblongis 1–1.2 mm. longis dorso sparse sericeis apice obtusis; ovario ellipsoideo pallide sericeo 2-loculari, pariete valde incrassato, loculis ut videtur 8-ovulatis, stylo mox caduco non viso; fructibus ellipsoideis maturitate ad 8×6 mm., basi et apice rotundatis, pericarpio circiter 1.5 mm. crasso, epicarpio tenui ruguloso, mesocarpio sparso fibroso, endocarpio verruculoso, loculo et semine solitariis.

NETHERLANDS NEW GUINEA: 6 km. southwest of Bernhard Camp, Idenburg River, alt. 1150 m., *Brass & Versteegh* 12551 (TYPE), Feb. 20, 1939 (tree 24 m. high, occasional in primary forest on a ridge; trunk 61 cm. diam.; crown not wide-spreading; bark 8 mm. thick, dark brown; sap-wood brown; heart-wood dark brown; fruits green), *Brass & Versteegh* 13107 (tree 30 m. high, frequent in primary forest on slope of a ridge; trunk 61 cm. diam.; crown not wide-spreading; bark 10 mm. thick, gray; wood white; young fruits green, the ripe ones blue).

In spite of the lack of perianth-parts, the cited specimens are sufficiently ample to permit recognition and description of this new species. The maturing ovaries of no. 12551 are accompanied by a few stamens. The relation-

ship of the new species is obviously with *E. altigenus* Schlechter and *E. luteolus* (described above), from both of which it differs in the dense and persistent pubescence of the lower leaf-surfaces, the short peduncles and pedicels, and the separate disk-lobes. In the length of its petioles and in its acuminate leaf-blades, *E. fulgens* resembles *E. altigenus*, while in its unawned anthers it resembles *E. luteolus*. The stamens of *E. fulgens* are shorter than those of its allies, indicating that the other floral parts may also prove to be smaller.

It is quite possible that *E. Ledermannii* var. *timoniifolius* Schlechter (in Bot. Jahrb. 54: 142. 1916) will prove to be identical with the new species.

PAPUASIAN ELAEOCARPI NOT PLACED IN SECTIONS

In the preceding pages I have attempted to place in Schlechter's system all the species not so placed by him and also those species described since his work in 1916. There remains a residue of species for which I can suggest no definite place in the system. Two of these species (*E. Muellerianus* Schlechter [*E. Ganitrus* sensu F. v. Muell. in Jour. Bot. 31: 321. 1893, non Roxb.] and *E. Reedyi* F. v. Muell. [*E. Arnhemicus* F. v. Muell. Pap. Pl. 1: 6. 1875, pro parte novo-guin., excl. typo austral.]) have never been properly described and may be dismissed as *nomina subnuda*. *Elaeocarpus aberrans* Brandis is a species of *Sloanea*, as which it will be discussed below.

The remaining unplaced species are *E. Sayeri* F. v. Muell., *E. florulentus* Ridley, *E. firmus* Knuth, *E. Peekelii* Knuth, and *E. rugulosus* Knuth. A careful perusal of the descriptions of these species convinces me that they are not represented in the Papuanian material now available, but critical points are sometimes omitted from the descriptions. An isotype of *E. firmus* is available but is not in condition to place.

(To be concluded)